

Design and Construction of Roads and Accesses to Adoptable Standards

Developer Guidance

**Second Edition
Revised October 2015**

**M. Murphy
Director of Communities**

Document Revisions

Second Edition - October 2015

[*Appendix B added*]

Contact Details

Section 38 Advice

Highways & Local Services

Technical Consultancy

Civic Centre

Newcastle upon Tyne

NE1 8QH

Telephone: (0191) 278 7878

Email: tc.section38@newcastle.gov.uk

Section 278 Advice

Highways & Local Services

Technical Consultancy

Civic Centre

Newcastle upon Tyne

NE1 8QH

Telephone: (0191) 278 7878

Email: tc.section278@newcastle.gov.uk

Transportation Development Advice

Transport Development

Civic Centre

Newcastle upon Tyne

NE1 8QH

Telephone: (0191) 211 6016

Email: td.consultation@newcastle.gov.uk

This information can be made available in large print, Braille, audio and other languages. Please telephone 0191 211 6051 for further information

Contents

List of Abbreviations	p. 4
Reference Documents	p. 5
Section 1 Purpose of the Document	p. 7
Section 2 Road and Street Hierarchy	p. 9
Section 3 Highway Surface Materials	p. 34
Section 4 Design & Construction Standards	p. 53
Section 5 Appendices	
Appendix A - Standard Highway Details	
Appendix B - Palette of Highway Materials	

List of Abbreviations

DDA	Disability Discrimination Act
MSA	Million Standard Axles
NCC	Newcastle City Council
PCC	Pre Cast Concrete
SHP&T	Strategic Housing, Planning, Transportation Directorate
TS	Technical Services Directorate

Reference Documents

Design Manual for Roads & Bridges (DMRB)

Department for Transport

Guidance on the Use of Tactile Paving Surfaces

Department of Transport and Local Government & the Regions

Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure

Department for Transport

Traffic Advisory Leaflet 6/02: An Introduction to Inclusive Mobility

Department for Transport

Manual for Streets Parts 1 and 2

Department for Communities & Local Government

Manual of Contract Documents for Highway Works

Department for Transport

NJUG Guidelines for the Planning, Installation & Maintenance of Utility Apparatus in Proximity to Trees (NJUG10)

National Joint Utilities Group

Traffic Signs Manual

Department for Transport

Transport in the Urban Environment (TUE)

Institution of Highways and Transportation

Legislation

- Crime and Disorder Act 1998 Section 17
- Disability Discrimination Act 1995
- Highways Act 1980
- New Roads and Street Works Act (NRASWA) 1991
- Town and Country Planning Act 1990
- Traffic Signs Regulations and General Directions 2002

Newcastle City Council Developer Guidance Documents

- Street Design Guide
- S38 Developer Guidance
- S278 Developer Guidance
- Street Tree Planting Design Guide

Newcastle City Council Planning Documents

- Unitary Development Plan (UDP)

Other

- Street Lighting Design Standards
Published by Scottish and Southern Electric (SSE) Lighting Services.

This guide is not intended to re-state nationally and locally accepted design standards set out in the above documents. Only exceptions and local variations will be detailed. It is setting out fundamental development considerations to aid development.

Section 1

Purpose of the Document

Newcastle City Council (NCC) is the Highway Authority for Newcastle upon Tyne, and has a duty to provide and maintain a functional and safe highway infrastructure that is fit for purpose for the residents of Newcastle and for the general users of its services and facilities.

This document provides guidance to developers and their agents on providing new highway that is required to be adopted and subsequently maintained by NCC.

This document replaces NCC's "Design and Construction Guidelines for Roads and Accesses to Adoptable Standards Manual (including standards for parking and loading)" (1988). It is a part of a suite of guidance documents that assist in ensuring that when planning applications are submitted, they contain all the necessary information in order to deliver effective outcomes.

The document has been compiled from local and national standards, but also incorporates new approaches to urban design, whilst still ensuring that highway solutions are safe and accessible to all.

By ensuring that the standards set out in this document are met, new and re-aligned existing highways will be:

- Quality public realm;
- Accessible areas;
- Maintainable by NCC, and
- Play a key role in the sustainability of the existing and new built environment.

This document contains the following 3 main sections

1. Road and Street Hierarchy

Provides definitions for each category of road and street within the adopted highway within Newcastle upon Tyne, and the inter-relationships between them.

2. Highway Surface Materials

Sets out the palette of surface materials that NCC requires developers to use on projects that affect the existing adopted highway, or for new highways that are subsequently to be adopted by NCC.

3. Adoption Standards for the Design and Construction of Roads and Accesses

Details the design and construction standards that developers must adhere to when proposing any new or reconfigured works on the existing adopted highway, or for new highways that are subsequently to be adopted by NCC.

Section 2

Road and Street Hierarchy

2.1 Hierarchy Definitions

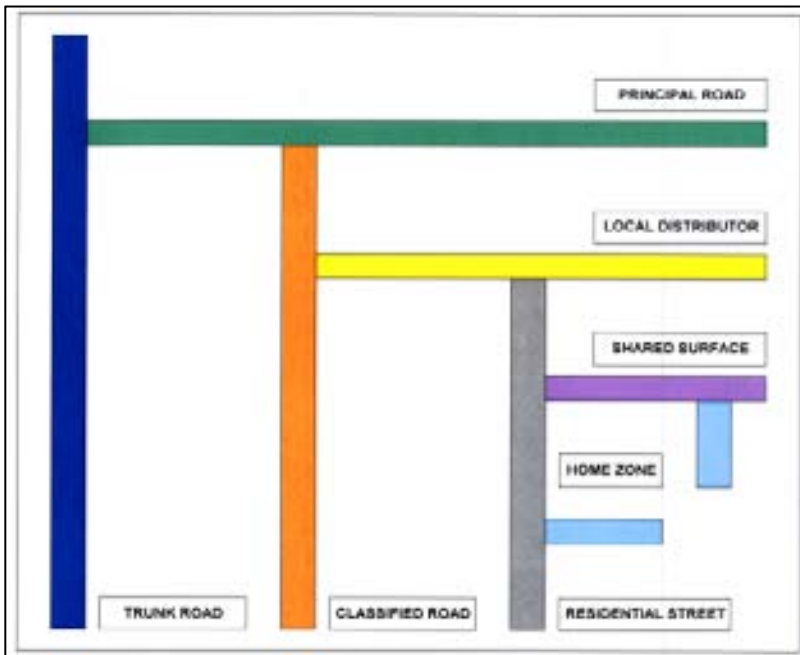
Newcastle City Council (NCC) has defined its “Hierarchy of Streets” within its Unitary Development Plan (UDP 1998). The Design & Construction Standards use UDP definitions, and adds further definition utilising the basic principles within “Transport in the Urban Environment” (TUE).

The Guidelines definitions for each street type are provided in the following section under the individual categories. UDP / NCC categories provided within round brackets (), and TUE categories provided within squared brackets [].

- **Principal Road** / (Strategic Highway) / [Primary Distributor Roads]
- **Classified Road** / (Main Distributor Road) / [District Distributor Roads]
- **Local Distributor Road** / (Secondary Distributor Road) / [Local Distributor Roads]
- **Collector Street : Residential Street (with Bus Route)** / (Local Roads) / [Access Roads]
- **Residential Street** / (Local Access Roads & Pedestrian Priority Streets) / [Access Roads]
- **Shared Surface Street** / (Pedestrian Priority Streets) / [Pedestrian Streets]
- **Home Zone**

This documents basic road and street hierarchy is shown in Figure 2.1. An example of the basic relationship between street types in Newcastle upon Tyne is shown in Figure 2.2.

The typical layouts within the sections are diagrammatic, and are used for illustration purposes only.



Road Type	Colour
Trunk Road	Blue
Principal Road	Green
Classified Road	Orange
Local Distributor Road	Yellow
Residential Street	Grey
Shared Surface	Purple
Home Zone	Light Blue

Figure 2.1 Basic Road and Street Hierarchy



Figure 2.2 Newcastle Road & Street Hierarchy

2.2 Principal Road

A Principal Road is “a non-trunk road, classified by the Secretary of State as being sufficiently important in the national highway system to justify principal status”.

Its primary role is “to cater for relatively fast moving, long distance traffic. These roads are expected to carry large volumes of traffic and be suitable for heavy goods vehicle (HGV) movements; they will be important classified roads with, in many cases, direct links to trunk roads” (UDP 1998).

It is a multi-purpose route, suitable for mixed modes of transport including car, cycle and public transport.

New developments fronting these routes must provide off-street parking solutions, which shall only be accessed from the side or rear of the development. Pedestrian movements must be segregated. There is little difference between this and a Classified Road.

For this document all Principal Roads shall be Dual Carriageways, including “dualled” Classified Roads.



Figure 2.3 **A Principal Road**

Highway Features	
Carriageway (Dual)	<p>Dimensions 7.30m Standard Width (3.65m Lanes) 8.80m including Cycle Lane 8.80m including No Car Lane</p> <p>Materials Bituminous : All Locations</p>
Footway	<p>Dimensions 2.00m Standard Width 3.00m including Cycle Lane</p> <p>Materials Urban : Flagstones / Bituminous Residential : Flagstones / Bituminous Industrial : Bituminous Rural : Bituminous</p>
Verge	<p>Dimensions 2.00m Minimum Width</p> <p>Materials Urban : Hard / Soft Landscape Residential : Hard / Soft Landscape Industrial : Soft Landscape Rural : Soft Landscape</p>
Central Reserve	<p>Dimensions 3.00m Minimum Width</p> <p>Materials Urban : Hard / Soft Landscape Residential : Hard / Soft Landscape Industrial : Soft Landscape Rural : Soft Landscape</p>
Parking Bays	Not Appropriate
Bus Lay-bys	<p>Dimensions 3.50m Standard Width</p> <p>Materials Bituminous : All Locations</p>
Cycle Lanes / Cycle Routes	<p>Dimensions 1.50m Minimum Width (On-Street Lane) 3.50m Minimum Width (Segregated Route) 3.00m Minimum Width (Shared Route)</p> <p>Materials To Match Footway or Carriageway</p>
Lighting	Lighting Columns

Table 2.1 Principal Road Features

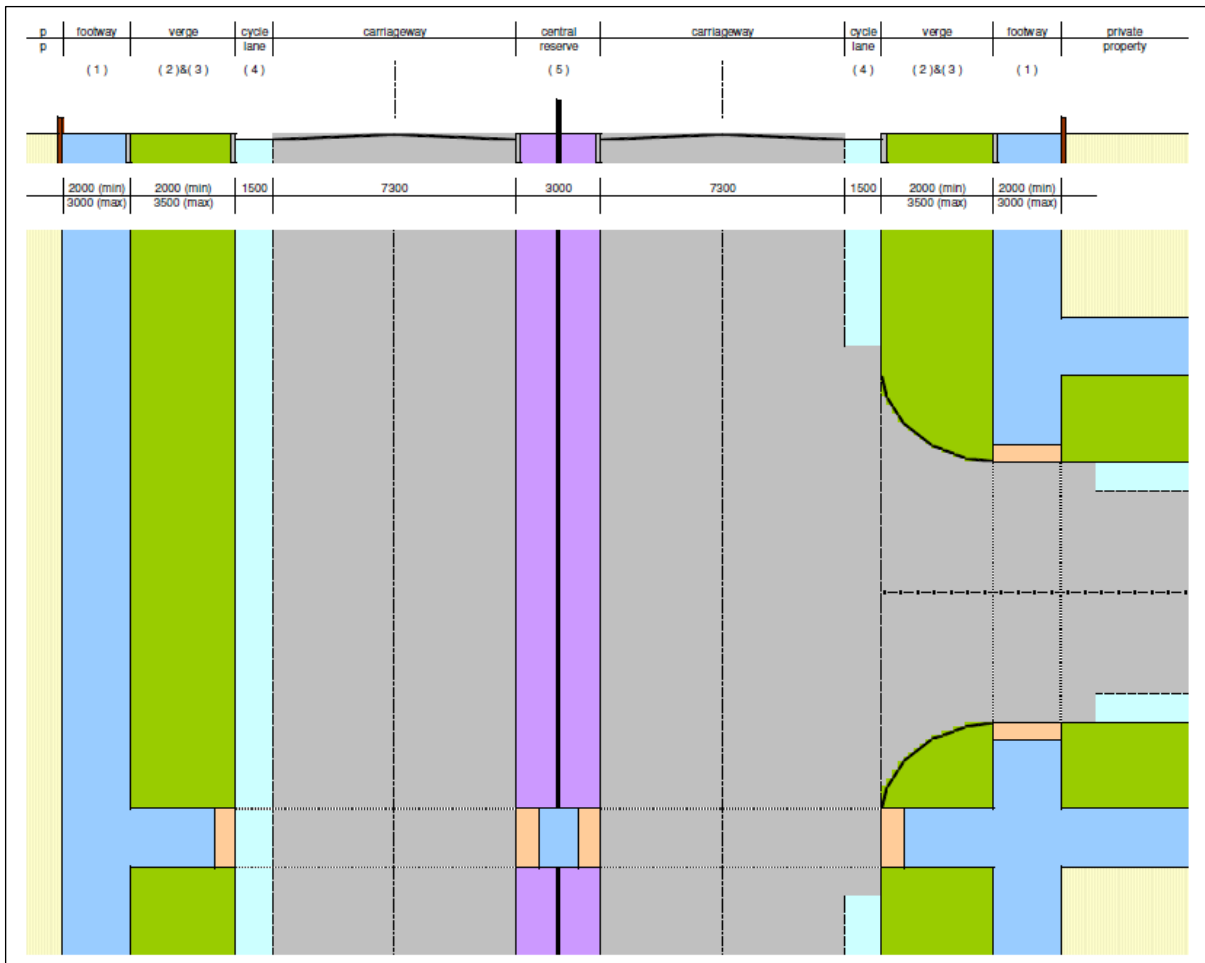
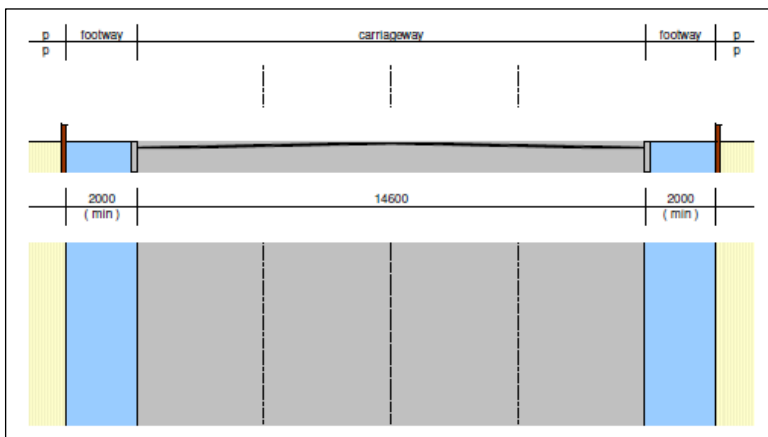


Figure 2.4 Example – Principal Road – Dual Carriageway Layout
Central Reserve, Cycle Lanes, Verge & Shared Footway/Cycle Lane



Carriageway	Grey
Cycle Lane	Cyan
Footway / Cycle Lane	Blue
Central Reserve	Purple
Verge	Green
Pedestrian Crossing	Orange

Figure 2.5 Principal Road – 4 Lane Single Carriageway

2.3 Classified Road

A Classified Road is “a highway, which is agreed by the Secretary of State and, where appropriate, the local highway authority as being of importance to the movement of traffic”.

“These roads distribute predominantly medium distance traffic and bus services within the principal residential, commercial and industrial areas. They connect strategic routes and form the main roads in those areas. They will often carry large volumes of traffic, which generally has an origin or destination close by.” (UDP 1998)

It is a multi-purpose route, suitable for mixed modes of transport including car, cycle and public transport.

New developments fronting these routes must provide off-street parking solutions, preferably accessed from the side or rear of the development. Pedestrian movements must be segregated.

Within the TUE there is little difference between this and a Principal Road.

For the purposes of this document all Classified Roads shall be Single Carriageways, including any Principal Road that is not “dualled”.



Figure 2.6 Classified Road

Highway Features	
Carriageway	<p>Dimensions 7.30m Standard Width (3.65m Lanes) 10.30m including Cycle Lanes (1.50m Lanes)</p> <p>Materials Bituminous : All Locations</p>
Footway	<p>Dimensions 2.00m Standard Width 3.00m including Cycle Lane</p> <p>Materials Urban : Flagstones / Bituminous Residential : Flagstones / Bituminous Industrial : Bituminous Rural : Bituminous</p>
Verge	<p>Dimensions 2.00m Minimum Width</p> <p>Materials Urban : Hard / Soft Landscape Residential : Hard / Soft Landscape Industrial : Soft Landscape Rural : Soft Landscape</p>
Parking Bays	Not Appropriate
Bus Lay-bys	<p>Dimensions 3.50m Standard Width</p> <p>Materials Bituminous : All Locations</p>
Cycle Lanes / Cycle Routes	<p>Dimensions 1.50m Minimum Width (On-Street Lane) 3.50m Minimum Width (Segregated Route) 3.00m Minimum Width (Shared Route)</p> <p>Materials To Match Footway or Carriageway</p>
Lighting	Lighting Columns

Table 2.2 Classified Road Features

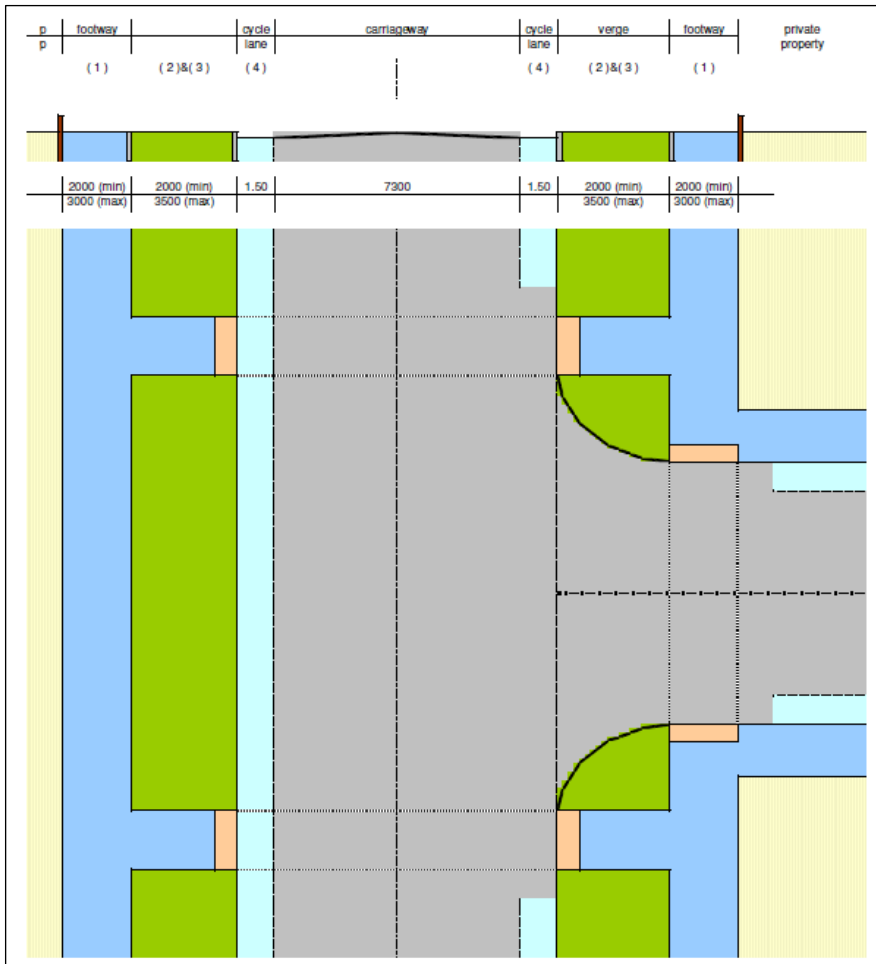
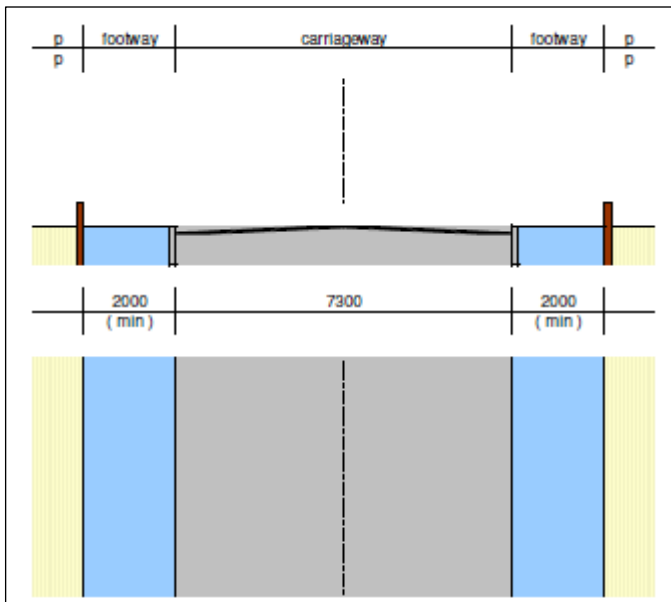


Figure 2.7 Example – Classified Road – Single Carriageway Layout
Cycle Lanes, Verge & Shared Footway/Cycle Lane



Carriageway	Grey
Cycle Lane	Cyan
Footway / Cycle Lane	Blue
Central Reserve	Purple
Verge	Green
Pedestrian Crossing	Orange

Figure 2.8 Classified Road – Single Carriageway

2.4 Local Distributor Road

A Local Distributor Road adopts the principles of a Classified Road with priority given to public transport.

“They connect principal and classified roads to smaller areas and carry significantly lower volumes of traffic than the other two, and fewer HGV’s. Local traffic will predominate and pedestrian movement may be controlled depending upon traffic conditions” (UDP 1998).

Pedestrian movements should be segregated.

Cycle lanes should be incorporated. Frontage access may need to be restricted and there will be parking on many of these roads; on-street parking should be discouraged, but when this is not achievable then distinct parking lay-bys / areas should be provided, and cycle lanes provided to suit or not appropriate for parking arrangements.



Figure 2.9 Local Distributor Road

Highway Features	
	<p>Dimensions 6.00m - 7.30m Standard Width 6.75m Standard Bus Route 6.90m Super Bus Route (3.45m Lanes) 9.00m – 10.30m incl. Cycle Lanes (1.50m Lanes)</p> <p>Materials Bituminous : All Locations</p>
Footway	<p>Dimensions 2.00m Standard Width 3.00m including Shared Cycle Lane</p> <p>Materials Urban : Flagstones / Bituminous Residential : Flagstones / Bituminous Industrial : Bituminous Rural : Bituminous</p>
Verge	<p>Dimensions 2.00m Minimum Width</p> <p>Materials Urban : Hard / Soft Landscape Residential : Hard / Soft Landscape Industrial : Soft Landscape Rural : Soft Landscape</p>
Parking Bays	None (Preferred Option)
Bus Lay-bys	<p>Dimensions 3.50m Standard Width</p> <p>Materials Bituminous : All Locations</p>
Cycle Lanes / Cycle Routes	<p>Dimensions 1.50m Minimum Width (On-Street Lane) 3.50m Minimum Width (Segregated Route) 3.00m Minimum Width (Shared Route)</p> <p>Materials To Match Footway or Carriageway</p>
Lighting	Lighting columns

Table 2.3 Local Distributor Road Features

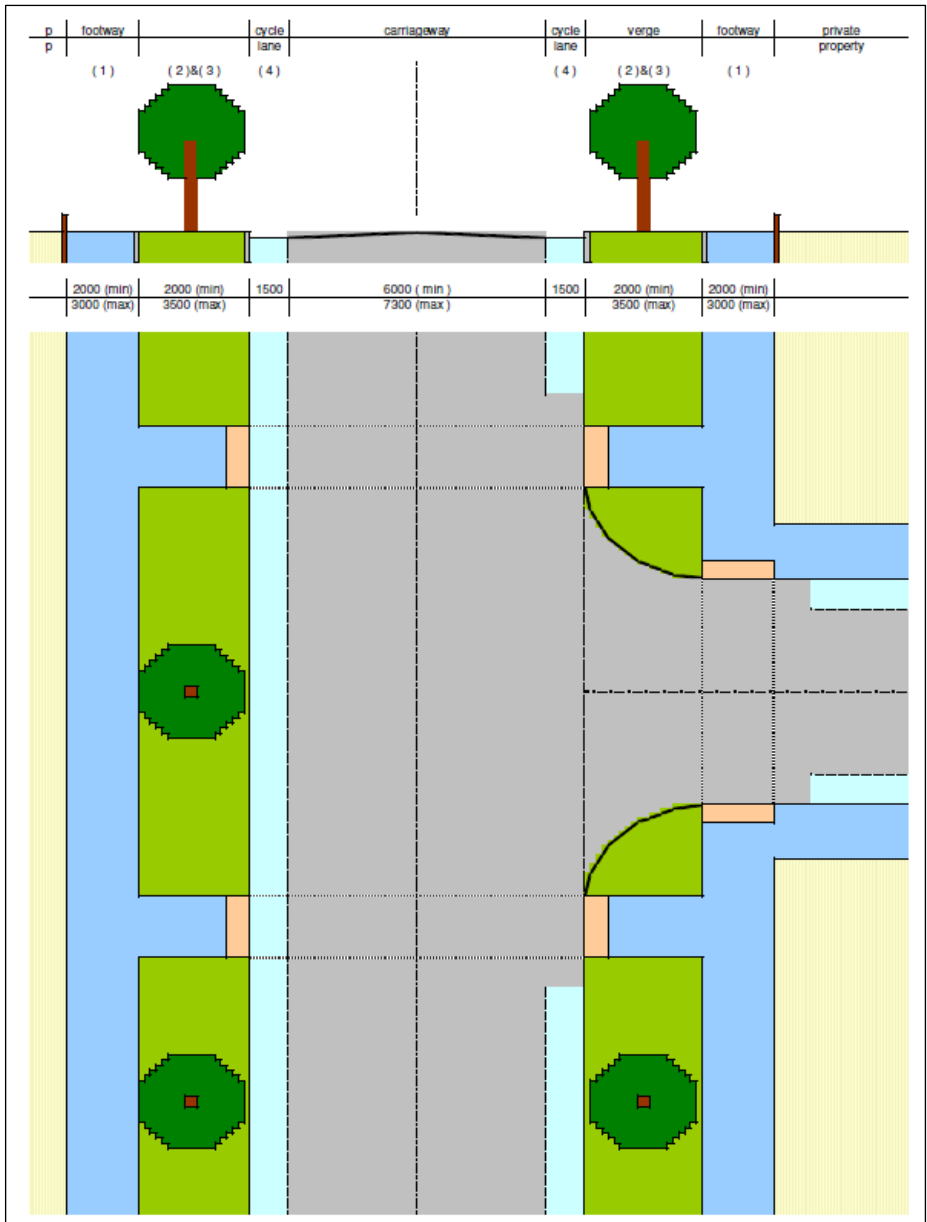


Figure 2.10 Example – Local Distributor Road: Single Carriageway Layout
Cycle Lanes, Verge & Shared Footway/Cycle Lanes

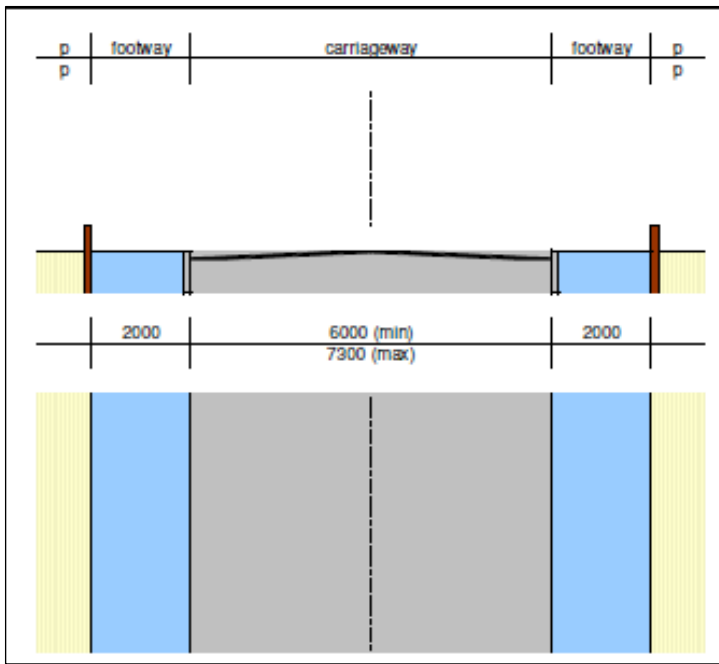


Figure 2.11 Local Distributor Road – Single Carriageway

2.5 Residential Street with Bus Route

A Residential Street with Bus Route is a main access route into and through residential areas, and connects Principal, Classified and Local Distributor Roads with Residential Streets.

It is regarded as a shared route, providing good means of access for pedestrians, cyclists, cars and local bus services that connect with main transport routes.

Convenient pedestrian facilities must be provided.

Parking is provided through distinct parking lay-bys.

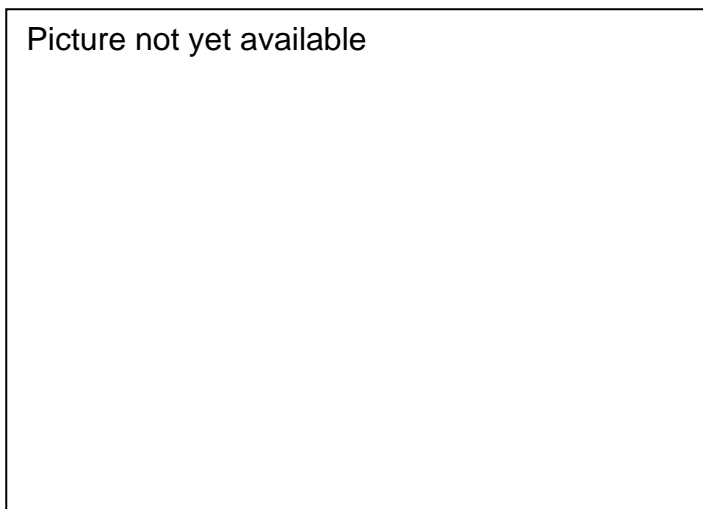


Figure 2.12 Residential Street with Bus Route

Highway Features	
Carriageway	<p>Dimensions 6.00m Standard Width 6.75m Standard Bus Route 6.90m Super Bus Route</p> <p>Materials Bituminous : All Locations</p>
Footway	<p>Dimensions 2.00m Standard Width 3.00m including Shared Cycle Lane</p> <p>Materials Urban : Flagstones / Bituminous Residential : Flagstones / Bituminous Industrial : Bituminous Rural : Bituminous</p>
Verge	<p>Dimensions 2.00m Minimum Width</p> <p>Materials Urban : Hard / Soft Landscape Residential : Hard / Soft Landscape Industrial : Soft Landscape Rural : Soft Landscape</p>
Parking Bays	<p>Dimensions 2.50m – 3.50m Standard Width</p> <p>Materials Bituminous : All Locations</p>
Bus Lay-bys	None
Cycle Lanes / Cycle Routes	<p>Dimensions 3.50m Minimum Width (Segregated Route) 3.00m Minimum Width (Shared Route) No Segregation on Carriageway</p> <p>Materials To Match Footway or Carriageway</p>
Lighting	Lighting columns

Table 2.4

Collector Street / Residential Street with Bus Route Features

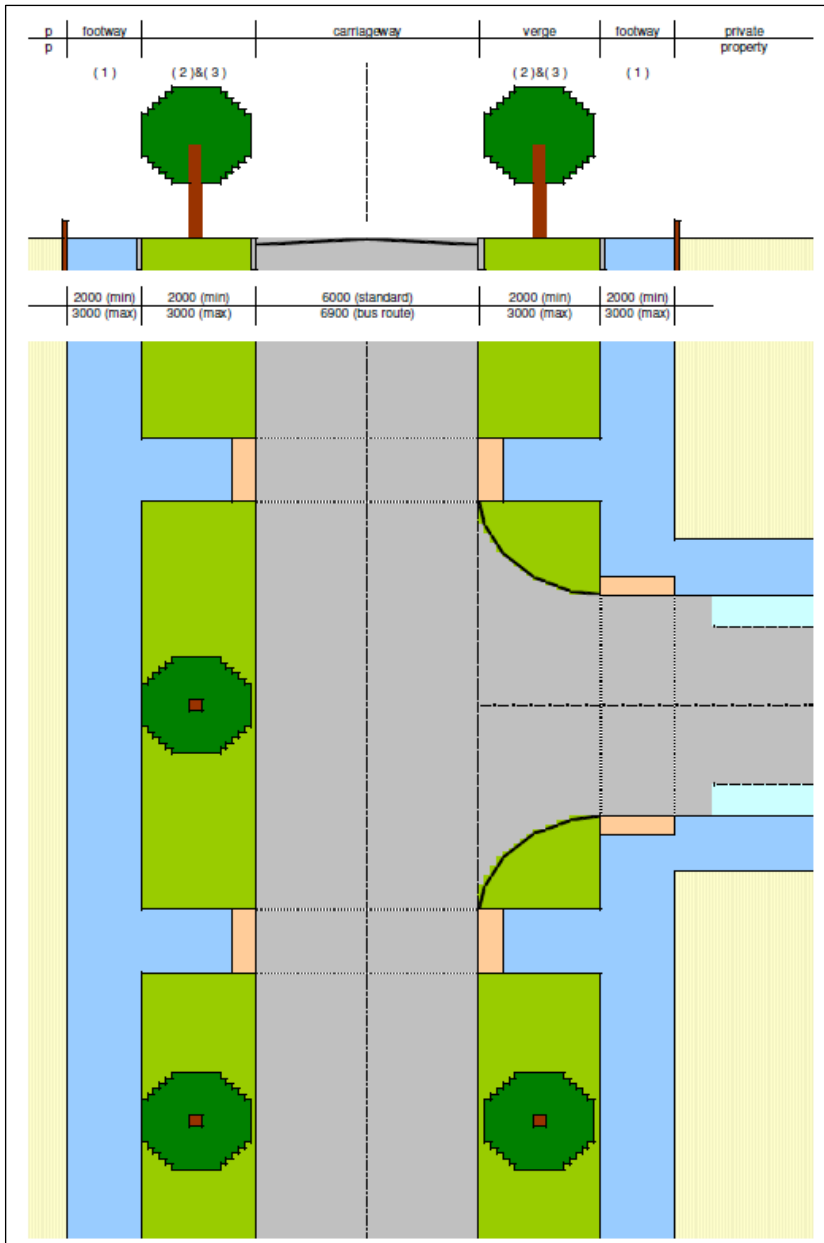
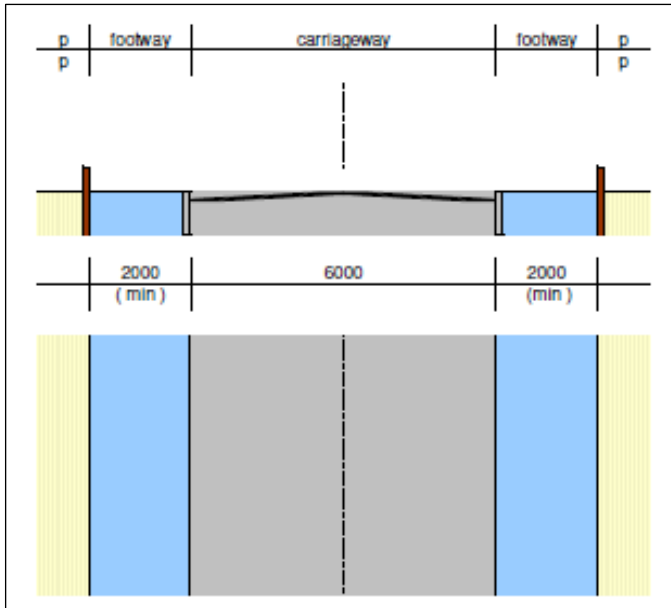


Figure 2.13 **Example – Residential Street with Bus Route – Single Carriageway Layout**
 Cycle Lanes, Verge & Shared Footway/Cycle Lanes



Carriageway	Grey
Cycle Lane	Cyan
Footway / Cycle Lane	Blue
Central Reserve	Purple
Verge	Green
Pedestrian Crossing	Orange

Figure 2.14 Residential Street with Bus Route – Single Carriageway

2.6 Residential Street

A Residential Street is a route within main areas of residential development, and connects Local Distributor Roads and Collector Streets with individual houses and properties. Its main function is to serve residential areas, prioritising pedestrian use whilst segregating carriageway and footways.

Cycle lanes on carriageway will be considered alongside the predominant character of the street and the amount of vehicular traffic. Pedestrian movements must be segregated.

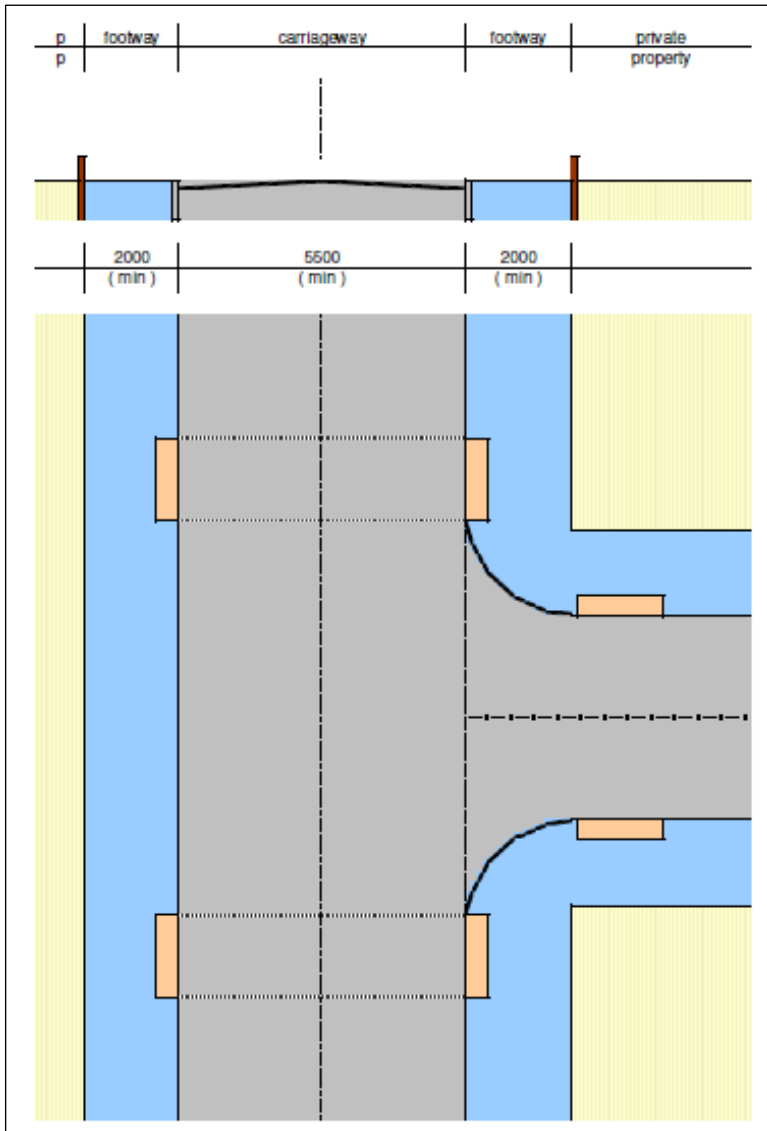
Parking is provided in curtilage or to the side or rear of the residential blocks. Traffic management measures may be required to ensure low traffic speeds.



Figure 2.15 Residential Street

Highway Features	
Carriageway	<p>Dimensions 5.50m Standard Width</p> <p>Materials Bituminous : All Locations</p>
Footway	<p>Dimensions 2.00m Standard Width 3.00m including Shared Cycle Lane</p> <p>Materials Urban : Flagstones / Bituminous Residential : Flagstones / Bituminous Industrial : Bituminous Rural : Bituminous</p>
Verge	<p>Dimensions 2.00m – 2.50m Width</p> <p>Materials Soft Landscape</p>
Parking Bays	<p>Dimensions 2.50m Standard Width</p> <p>Materials Bituminous : All Locations</p>
Bus Lay-bys	None
Cycle Lanes / Routes	On Carriageway
Lighting	Lighting columns

Table 2.5 Residential Street Features



Carriageway	Grey
Footway	Blue
Central Reserve	Purple
Verge	Green
Pedestrian Crossing	Orange

Figure 2.16 Example Residential Street Layout

2.7 Shared Surface Street

A Shared Surface Street is used by all forms of transport. They are often in locations where multi-mode routes are required, but with limited motor vehicle dominance to ensure a more pleasant environment for other users.

Pedestrian movements are not segregated, although delineation between pedestrian and motor vehicular movements can be implied with the use of formal “flush” channels or changes in block work bonding patterns to suit.

Parking can be provided in curtilage or to the side or rear of the residential blocks, but may also be provided on-street, subject to street alignment and inter-visibility.

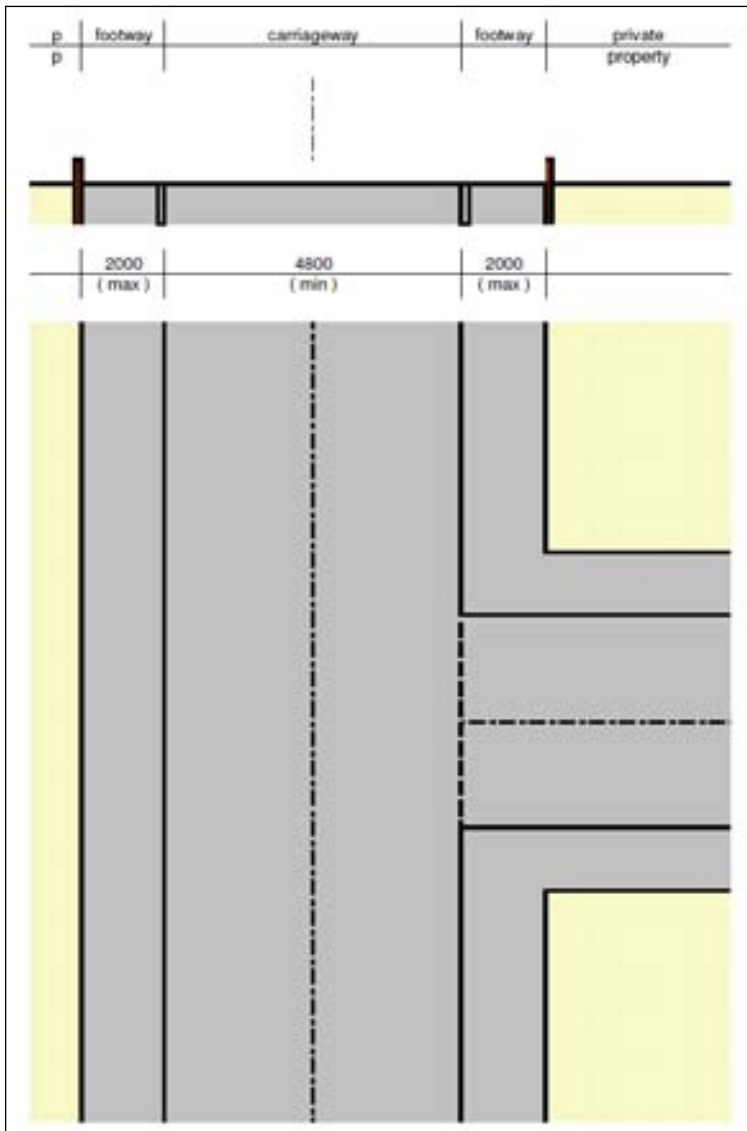
Statutory Undertaker’s apparatus shall be located in soft landscaped Service Strips on both sides of “carriageway” (Section 4.18 for additional information).



Figure 2.17 Shared Surface Street

Highway Features	
	<p>Dimensions 4.80m Minimum Width</p> <p>Materials Bituminous / Block Paving / Setts</p>
Footway (Optional)	<p>Dimensions 2.00m Maximum Width</p> <p>No Kerbs Channels used to delineate (if required)</p> <p>Materials Bituminous / Block Paving / Setts</p>
Service Strip (if “footway” is not provided)	<p>Dimensions 2.00m Minimum Width</p> <p>Kerbs (Optional) Channels used to delineate (if kerbs not provided)</p> <p>Materials Soft Landscape</p>
Verge	Incorporated within Service Strips
Parking Bays	Incorporated within Shared Surface subject to layout
Bus Lay-bys	Not Allowed
Cycle Lanes / Routes	On Carriageway – No Segregation
Lighting	Lighting Columns

Table 2.6 Shared Surface Street Features



Shared Surface

Figure 2.18 Example Shared Surface Street Layout

2.8 Home Zone

Home Zones (including Mews and Courtyards) are intended for residents use only, not for public transport, or as a through route for other forms of traffic. The streets are designed to limit the speed and volume of traffic, emphasising other users, such as cyclists and pedestrians. This creates a safer and more pleasant environment for movement and social interaction.

Pedestrian movements are not segregated, the emphasis is on pedestrians. Parking can be provided in curtilage or to the side or rear of the residential blocks, but may also be provided on-street, subject to layout.

Statutory Undertaker's (SU) apparatus located in soft landscaped Service Strip on both sides of "carriageway" (Section 4.18 for additional information).

If a single strip is proposed then the developer must prove that all necessary Statutory Undertaker apparatus can be accommodated within the single verge (width to be agreed with EDER officers).

When a service strip(s) cannot be provided and SU apparatus must be accommodated within the "carriageway" then a minimum width of 4.80m over and above the width of the "in-carriageway" service strip is required to ensure motor vehicular access can be maintained during SU maintenance and repair works on apparatus. It is not permissible to prevent access to properties in the event of SU's requiring access to their apparatus.

Street lighting shall be located within adoptable locations, but not within the "carriageway"

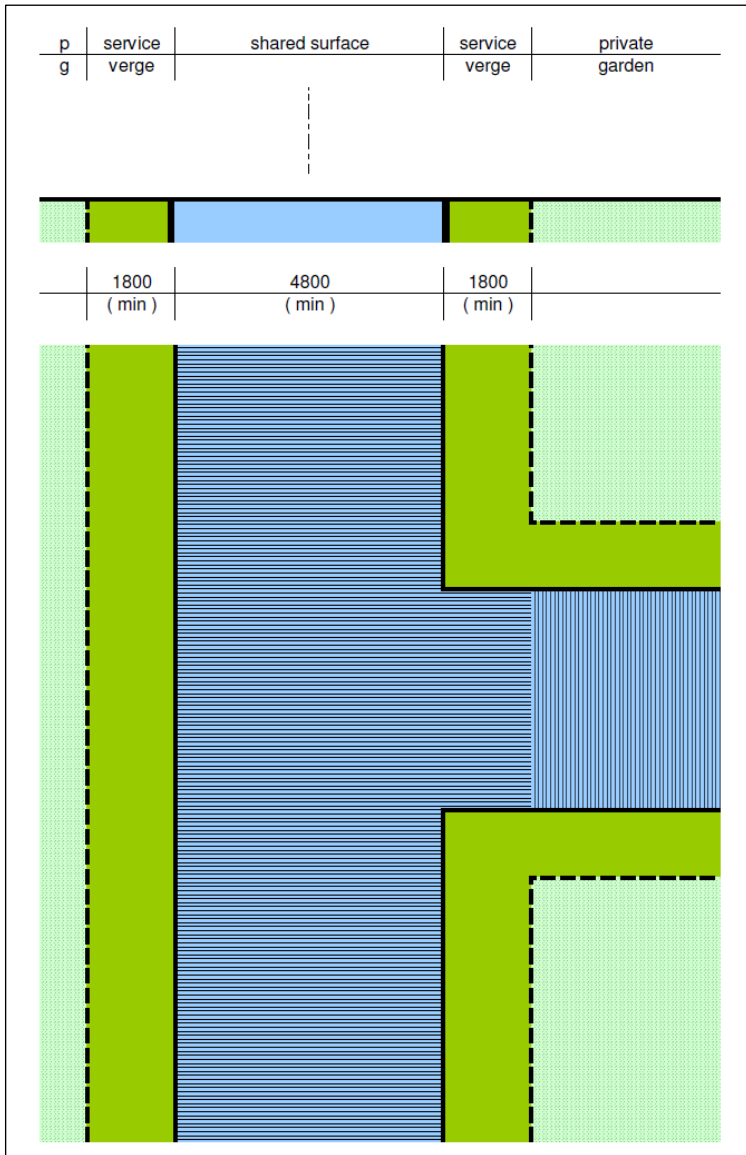


Figure 2.19

Home Zone

Highway Features	
	<p>Dimensions 5.50m Standard Width (2-way vehicle movement) 4.80m Minimum Width 3.70m Absolute Minimum for “short throttles”</p> <p>Materials Bituminous / Block Paving / Setts</p>
Footway	<p>Dimensions Included in Carriageway</p> <p>Materials Bituminous / Block Paving / Setts</p>
Service Strip (for S.U.s)	1.80m Minimum Width (both sides of “carriageway”)
Parking Bays	No lay-bys. On-street bays subject to layout
Bus Lay-bys	Not Allowed
Cycle Lanes / Routes	On “carriageway” – No Segregation
Lighting	Lighting columns

Table 2.7 Home Zone Features



Footway	
Verge	

Figure 2.20 Home Zone

Section 3

Highway Surface Materials

3.1 General Overview

A limited palette of surface materials is used across the City when working within the adopted highway and associated public realm. The palette balances the need for a high quality, aesthetically pleasing standard and maintenance programmes.

Prescribing a fixed palette of surfacing materials limits material treatments to a manageable number whilst still considering:

- Construction Materials;
- Colours and Textures;
- Dimensions;
- Standardised Products; and
- Manufacturers and Suppliers.

Further consideration is also given to:

- Locally Sourced Materials (Regional or Indigenous to UK) wherever possible;
- Sustainable Sources and Products;
- Equality and Diversity standards throughout the supply chain;
- Recycled and Recyclable Products; and
- Economies of Scale / Critical Mass of materials when considering future maintenance requirements.

It is recognised that one size does not fit all, but NCC requires control of the variety of products and materials used within the adopted highway and associated public realm.

Higher specification materials and one-off schemes may require additional commuted sums to reflect the additional maintenance and replacement costs required or areas may not be adopted, with all future responsibility resting with the developer through a S106 agreement – early discussions with NCC around this topic are essential.

3.2 Highway Cross Section

The hierarchy of roads and streets defined in Section 2 all have typical cross-sections, which will vary subject to a specific combination of factors for particular locations. They all retain standard highway elements in combination, such as footways, verges, central reserves and carriageways, and each element has specified construction materials that can be used.

The design and construction standards in Section 4 are consistent for the majority of locations and situations, especially below the surface course, but the surface course itself can change with respect to material, colour and texture.

Sections 3.3 and 3.4 specify the surface treatments / palette of materials which comply with NCC's asset management.

3.3 Footways and Footpaths Materials

Kerbs, Channels and Edgings

Material Requirements

The majority of standard kerbs, channels and edgings used throughout the City are Pre-Cast Concrete (PcC) elements of industry standard size, strength and colour. They have been used for many years in most areas of the City and are easily procured from a variety of local suppliers. Table 3.1 below sets out the kerbs, channels and edge requirements.

Design and Construction Standards for the surface materials and underlying constructions are provided in Section 4.

NCC are keen to consider any PcC product using a high percentage of recycled materials that meets the specification standards set out in Section 4.

City Centre treatments use natural stone elements, generally granite, and any proposed developments within the City Centre area are required to match this treatment, especially within the historic Grainger Town area. Any variation on this palette of materials will require detailed pre-planning discussions.

Conservation Areas contain a variety of differing materials, and any new or extended development, should match the existing adjacent materials. Any variation to the existing palette of materials will require detailed pre-planning discussions.

Element	Material	Colour	Dimensions
Kerb <ul style="list-style-type: none"> • Half-Battered • Bull-Nosed • Splayed (semi-rural areas only) 	PcC Standard PcC "Conservation"	Grey Charcoal or Silver Grey	Height 255mm Width 125mm Length 905mm
	Natural Stone (Granite)	City Centre : Silver Grey [Granite Ref : G371] Elsewhere : Varies	Height 200mm Width 300mm Length 800mm
Channel <ul style="list-style-type: none"> • Standard • Dished • Grooved • Threshold 	PcC Standard PcC "Conservation"	Grey Charcoal or Silver Grey	Height 150mm Width 205mm Length 905mm
	Natural Stone (Granite)	City Centre : Silver Grey [Granite Ref : G371] Elsewhere : Varies	Height 200mm Width 300mm Length 900mm
Edging	PcC Standard PcC "Conservation"	Grey Charcoal or Silver Grey	Height 150mm Width 50mm Length 905mm

Table 3.1 Kerbs, Channels and Edge Restraints

Flagstones

All flagstones within the City Centre shall have a protective treatment applied to prevent staining and gum sticking.

Pre-cast Concrete Paving Flags

The majority of standard flagstones used throughout the City are Pre-Cast Concrete (PcC) elements of industry standard size, strength and colour. They have been used for many years, are easily procured from local suppliers, and regarded by NCC as "fit for purpose" (see Table 3.2).

PcC flagstones shall have a grit blasted textured surface finish.

NCC are keen to consider any PcC product using a high percentage of recycled materials that meets the specification standards set out in Section 4.

Natural Stone Paving Flags

Natural stone paving is used in the City Centre, generally Caithness (silt/mud stone) within the Grainger Town area, and Yorkstone (sandstone) on the Quayside. New developments shall use Caithness paving, unless an alternative is agreed with NCC.

Caithness and Yorkstone paving shall have a riven textured surface finish.

Conservation Areas contain a variety of differing flagstones, and new developments shall match the existing material. Any variations to this will require detailed pre-planning discussions.

Additional Information

NCC specify flagstones in the following areas:

- City Centre;
- Conservation Areas with flagstones;
- Local shopping / amenity areas; and
- Principal pedestrian routes with regular “foot fall” within, towards and adjacent to formal local amenity areas.

NCC can no longer provide new, or maintain existing, residential streets with flagged footways. Locations other than those listed above should always provide flexibly constructed footways.

Any developer proposing flagstones for their adopted highway public realm works must comply with NCC’s specified palette of materials for that area, unless otherwise approved by NCC after consideration of future maintenance and liability.

Element	Material	Colour	Dimensions	
Flagstones <ul style="list-style-type: none"> Standard 	PcC	Charcoal or Silver Grey	Length Width Depth	450mm 450mm 70mm
Flagstones <ul style="list-style-type: none"> Existing Infill Areas 	PcC	Charcoal or Grey	Length Width Depth	900mm 600mm 63mm
Flagstones <ul style="list-style-type: none"> City Centre Grainger Town 	Caithness (Mudstone, Siltstone)	Dark Grey (as it comes from the quarry)	Length Width Depth	395 - 1000mm 395, 595, 795, & 1000mm 70mm
Flagstones <ul style="list-style-type: none"> Northumberland Street Quayside 	Yorkstone (Sandstone)	Yellow / Brown (as it comes from the quarry)	Length Width Depth	400 - 800mm 400, 600 & 800mm 70mm

Table 3.2 Flagstones

Block Paving

Material Requirements

The majority of standard block pavers used throughout the City are Pre-cast Concrete (PcC) or Clay elements of industry standard size and strength, but varying in colour and marbling effects.

NCC does use a minimum number of standard blocks with limited colour choice for Planned Highway Maintenance and Local Transport projects.

These products are available from a variety of local suppliers, and generally regarded by NCC as “fit for purpose”, predominantly for use in:

- Highway verges
- Central reserve infill;
- Detailing within junction footways;
- Hard landscape areas;
- Off-street parking areas;
- On-street parking bays;
- Vehicular crossing points in footways;
- Within permanent traffic management features.

Sett Paving

Material Requirements

The majority of standard sett paving is used in City Centre streets, mainly as detailing/infill around street furniture posts & bases, and in “ornamental” areas in junctions on strong pedestrian routes, made from natural stone, predominantly granite, with variable dimensions.

Large sized setts used in verges to deter pedestrian movements.

“Cobbled” granite setts are no longer used in footways as they are not easily procured and remaining areas are only maintained whilst fit for purpose. The setts may be removed once they reach the end of their serviceable life, unless there are of overriding historic / conservation importance.

Element	Material	Colour	Dimensions	
Blocks	PcC	Charcoal Grey Red Brown	Length Width Depth	200mm 100mm 80mm
	Clay (Pedestrian Areas Only)	Red Brown (Brindle)	Length Width Depth	200mm 100mm 65 / 80mm
Setts • Chips • Cobbles	Granite	Red Brown (Varies)	Length Width Depth	100 - 200mm 100mm 100mm

Table 3.3 Block and Sett Paving

Flexible Footways

Material Requirements

Bituminous materials are used for the construction of the majority of footways, cycle lanes and cycle tracks in the City, excluding the City Centre and areas itemised in Section 3.4.

Black and Red coloured surface courses are used. Black is most commonly used, unless the works are an infill to an existing red surface. Red and other coloured surfacing attracts an additional cost.

Element	Material	Colour	Dimensions	
Surface Course	AC6 Dense Surf to PD 6691 Clause B.3.5.3. *	Black	Depth	25mm
Binder Course	AC20 Dense Bin to PD 6691 Clause B.3.4.8. *	Black	Depth	60mm

*European Standard BS EN 13108: Bituminous Mixtures - Part 4, and BS PD 6691:2007

Table 3.4 Bituminous Footways

Special Treatments

Material Requirements

High profile developments may have bespoke surface treatments within their own private realm, but these areas are not maintained by NCC.

Maintenance of these areas is the responsibility of the developer and will be secured through a S106 agreement. The use of these materials will require early pre-planning discussions to ensure that we create high quality developments that are fit for purpose.

Additional Information

The maintenance regime for bespoke treatments in adopted areas is very onerous for NCC, and NCC would require developers to provide commuted sums for future maintenance.

Whilst NCC will continue to support innovation within the public realm, it is unreasonable to have widespread individuality.

Tactile Paving – Blister (Dotted) Paving

Controlled Pedestrian Crossings

RED tactile “blister” paving shall be provided on pedestrian routes in the following locations / crossings:

- Zebra
- Pelican
- Puffin
- Toucan
- Pegasus

Uncontrolled Pedestrian Crossings

BUFF tactile blister paving shall be provided on pedestrian routes in the following locations:

- Associated with a formal pedestrian refuge;
- City centre sites;
- Main pedestrian thoroughfares;
- Within and on primary routes to local amenity areas; and
- On major bus routes, to facilitate access to and from bus stops.

Tactile blister paving should **not** be provided at uncontrolled pedestrian crossings at the following locations, however, consideration should be given for their provision on strong pedestrian routes:

- Residential streets;
- Back lanes;
- Minor side streets.

Dimensions

When tactile paving at pedestrian crossings are required the minimum dimensions must be as follows in accordance with DDA requirements:

- Width – 1800mm (absolute minimum)
 - provided at the dropped section only (kerb upstand 0-6mm maximum)
- Depth – Crossings along predominant route (in the direction of “going”) = 1200mm
 - Secondary Crossings perpendicular to predominant route = 800mm

Placement

Suitable locations for tactile blister paving in accordance with Inclusive Mobility and the Disability Discrimination Act can be found in “Guidance on the Use of Tactile Paving”, published by the Department for Transport. Sensory Support and Newcastle Disability Forum support the principles laid out in these documents, and tactile blister paving shall, wherever practicable, be provided within the side street on the straight section immediately next to the tangent point of the junction radius.

If this location is more than 5 metres from a recognised “desire line” across the junction, then an additional dropped crossing shall be provided on the desire line without tactile blister paving.

If a pedestrian crossing with tactile blister paving cannot be provided within the side street, then a pedestrian crossing with tactile blister paving can be provided on the desire line within the radius then the minimum depth must be 800mm flagstones at its narrowest point, with a greater depth provided to accommodate the radius.

Figures 3.1 – 3.5 demonstrate placing of tactile paving.

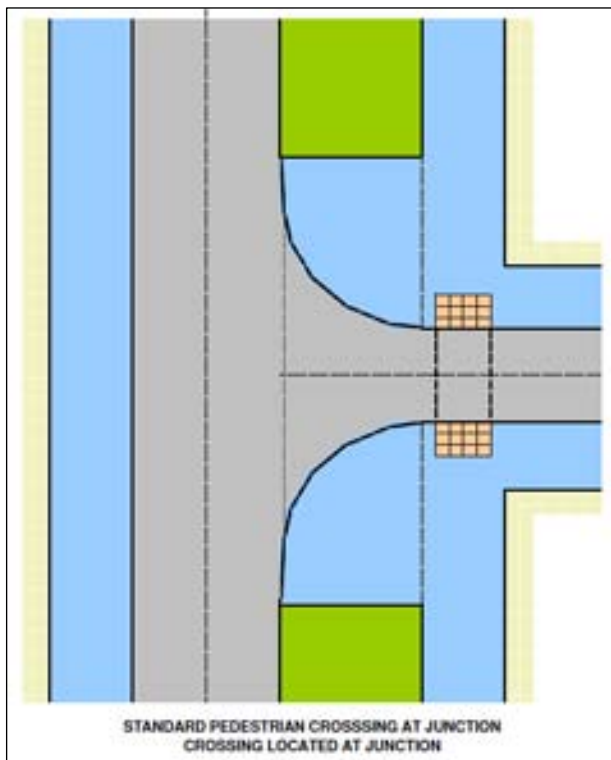


Figure 3.1

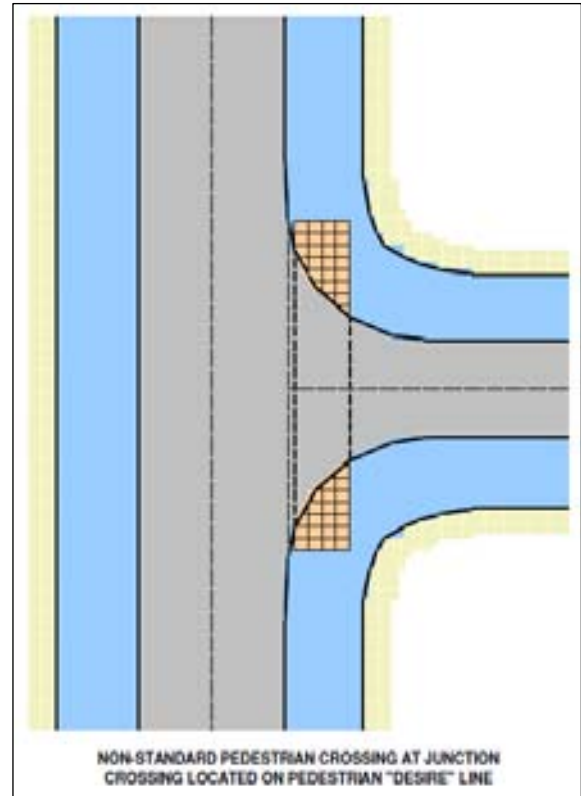
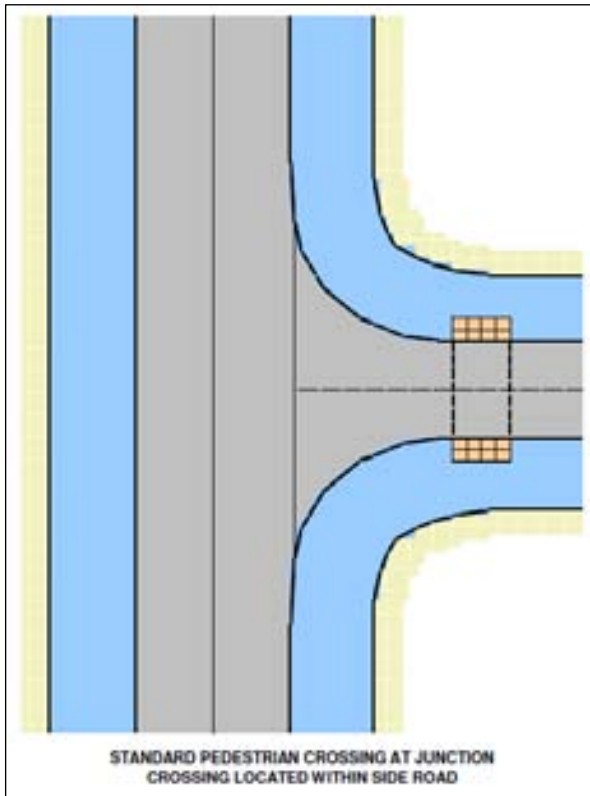


Figure 3.2

Figure 3.4

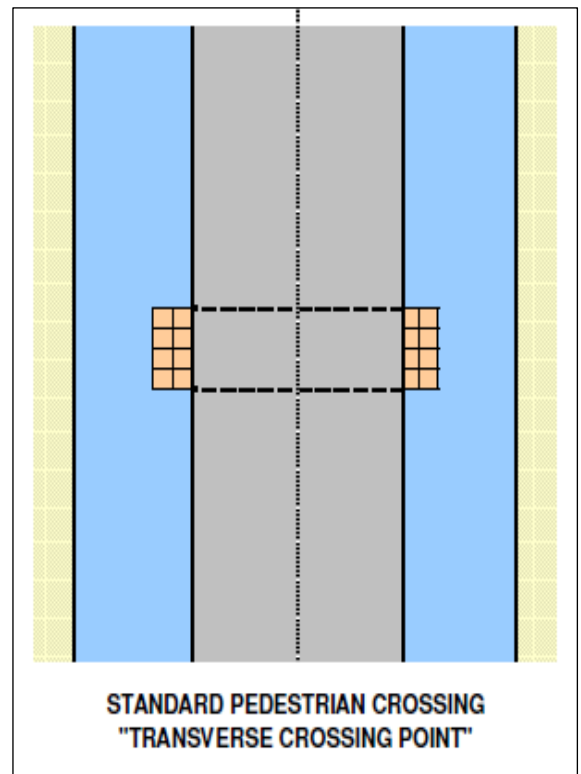
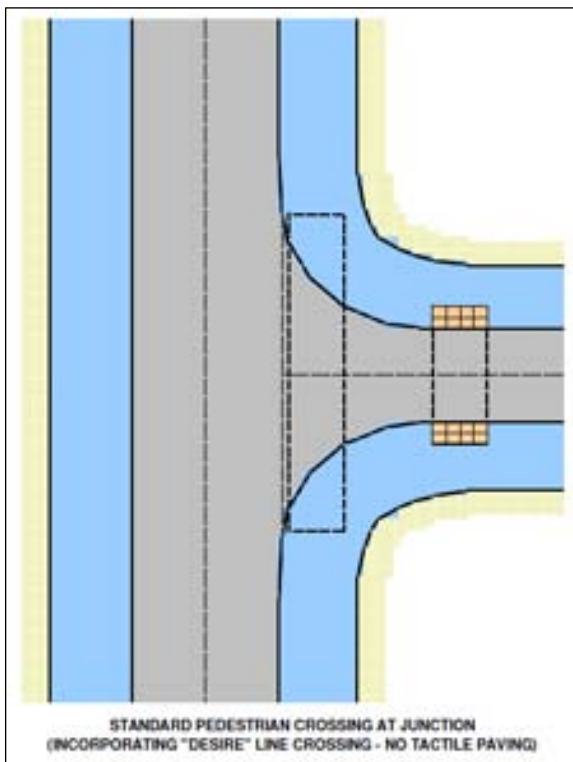


Figure 3.3

Figure 3.5

Gradients

Standard transition kerbs (900mm long) at dropped crossings reduce the kerb height from 100mm (standard) to 25mm (normally at vehicular crossings), creating longitudinal and transverse gradients of 8% (1 in 12), which comply with DDA requirements.

However, pedestrian crossings require a 0 to 6mm kerb height. When a standard transition kerb is used this creates gradients of 11% (1 in 9), which do not comply with DDA requirements.

This can be resolved by the following two additional construction requirements at the crossing:

- Reduce the kerb height on the last kerb before the transition to 80mm at the tie-in, and drop from 80mm to 0-6mm over 900mm, which will provide a longitudinal gradient of 8% (1 in 12).
- Drop the full width of footway across the pedestrian crossing, with a constant slope from back of path to front of kerb to ensure a minimum of 8% (1 in 20) cross-fall.

Tactile Paving – Corduroy (Ribbed) Paving

At Steps

Corduroy paving shall be provided at the bottom and top of any flight of steps or staircase within the public highway. It is not required at the foot or top of any feature within the public highway, such as plinths to monuments etc.

Corduroy minimum width of paving shall be 800mm for the full width of the steps or stairs, set back 400mm from the base of the bottom riser and the nosing of the top tread,

Corduroy paving is not required on landings within a series of steps or staircases.

Tactile Paving – Parallel Flat-topped Bars Paving

As part of a Formal Cycle Route

Tactile paving with parallel bars with a flat topped profile laid to the direction of travel shall be provided at the start and finish of formal cycle routes within the public highway.

3.4 Carriageways and Shared Surfaces

Flexible Carriageway

Material Requirements

Bituminous “flexible” materials are used for the construction of the majority of carriageways, lay-bys, accesses and car parks throughout the City.

New and existing roads shall be surfaced with Hot Rolled Asphalt (HRA) surface course, 40-50mm thick, with 20mm pre-coated chippings. Design and Construction Standards for these elements are provided in Section 4.

HRA shall be used at all times except in the following circumstances:

- Existing Collector Streets & Residential Streets where the majority of adjacent surface treatments are not HRA – surface course material to be determined site-by-site;
- Existing & New Shared Surface Streets;
- Existing & New Home Zones, Mews and Courtyards.

Additional Information

Between 2002 and-2007, Highway Maintenance projects resurfaced many Principal, Classified and Local Distributor Roads with a Thin Surface Course (TSC) treatment. In 2007 NCC commenced resurfacing all Main Roads and majority of Residential Streets with HRA.

Concrete Carriageways

Material Requirements

Concrete carriageway constructions are not to be used for any new roads or accesses within the Adopted Highway.

NCC requires all new access to be constructed of bituminous material. Any existing concrete carriageways affected by a new access shall be reconstructed of bituminous materials.

Developments requiring a new access on to an existing concrete carriageway will be dealt with on an individual basis.

Additional Information

Concrete carriageways were constructed in residential estates in the City until the 1970's. The majority are designated as Residential Streets or lower and are not designated as formal vehicular routes passing through estates.

The maintenance approach has been in accordance with one of the following:

- “Piecemeal” replacement with an in-situ concrete construction;
- Joint replacement;
- Joint over banding; or
- “Crack and seat” reconstruction.

If the concrete slab's integrity is the main concern, then there are two options – either overlay with an HRA surface course (level constraints), or “crack and seat” reconstruction (break up slab in formalised grid pattern, compact slab, reconstruct above with HRA surface course over an Asphalt Concrete binder course).

Block Paved Carriageways

Material Requirements

NCC uses Pre-cast Concrete (PcC) blocks in residential home zones, shared surfaces and visitor parking bays. Natural Stone blocks are used within shared surfaces in the Grainger Town area.

Natural stone and concrete block construction details are shown in Appendix A: Standard Details.

Additional Information

The City Centre's heritage and conservation areas predate the 1920's, and have thick (750mm +) highway constructions, comprised of natural stone materials. NCC replaced many streets with bituminous constructions, until the inception of the Grainger Town Project in the 1990's.

The Grainger Town Project treated key routes differently. Shared surfaces & pedestrian zones were constructed with granite blocks over cementitious sub-bases.

Small modular sized Caithness flagstones were used in lieu of blocks in specific areas, after extended consultation and consideration, and all flags were placed on to very robust carriageway constructions.

Sett Paved Carriageways

Material Requirements

Cobbled granite setts in footway and carriageway construction are no longer used, although minor detailing areas are still present in central pedestrianised areas, but are only maintained whilst “fit for purpose”, otherwise they are removed as and when they reach the end of their serviceable life.

Cobbled granite setts are not easily procured.

Additional Information

Many smaller side roads, back lanes and servicing routes in the City Centre were unaffected by the GTP regeneration programme.

In many cases these surfaces are comprised of cobbled setts or granite “chips”, overlying a shallow bedding layer, lying on top of a deep sandstone “penning” sub-base.

The penning generally has a very coarse grading, with upper grading sizes exceeding 200mm. This makes these areas difficult to maintain. NCC either “lift or relay” areas on a new bedding layer in a piecemeal manner, or completely reconstruct using modern equivalent constructions, or replace with bituminous materials. Anything other construction greatly affects the integrity of the sandstone penning.

Element	Material	Colour	Dimensions	
Setts <ul style="list-style-type: none">• Chips• Cobbles	Granite	Red Brown (Varies)	Length	100mm 200mm
			Width	100mm
			Depth	100mm 150mm

Table 3.5 **Sett Paving**

Special Treatments

High Friction Surfacing

NCC utilises high Polished Stone Value (PSV) aggregates within the Hot Rolled Asphalt (HRA) surface course and pre-coated chippings to provide the required friction in advance of traffic signal stop lines, roundabout entry legs, and entry to, through and exit from tight bends and curves. Suitable PSV values can be determined from relevant national standards.

NCC does not use overlying High Friction Surfacing (HFS) systems as it has proved to be a high maintenance liability in the past, and have required extensive temporary traffic management provision to maintain due to the locations mentioned above.

Thermoplastic Infills & Cycle Lane Reservoirs

Thermoplastic materials to designate key carriageway features are used sparingly. The main use is for Green Infills within “cycle reservoirs” at traffic signal controlled crossings and junctions. NCC no longer provide green cycle reservoir infills due to the high maintenance costs and the poor ride quality for cyclists.

3.5 Approval Process for Highway Surface Materials

For any development which requires highway works to be constructed under:-

- Section 38 Agreement of the Highways Act 1980, which will subsequently be adopted by Newcastle City Council; or
- Section 278 Agreement of the Highways Act 1980 on the existing Adopted Highway

The developer must enter into early pre application discussions with NCC to create positive highway outcomes and delivery.

Section 4

Design and Construction Standards

4.1 Introduction

This section sets down the requirements for the dimensions and layout of all road and street types within Newcastle City Council (NCC), and for the basic treatment and materials for those roads and streets.

The principal design document for the layout of roads is the Design Manual for Roads and Bridges (DMRB), and the document for streets within residential developments is the Manual for Streets (MfS).

Standards and Drawings

This section of the document sets out the required standards and specifications that developers must provide for the design and construction proposals for roads and accesses to be adopted by NCC.

Whilst there may be a certain amount of flexibility in order to achieve higher standards, proposals which differ in any way from this specification require special consideration.

Standard Details have been included in Appendix A.

New Adopted Highways

Section 38 Agreement

For new highways which a developer seeks to have adopted, the developer must enter into an agreement with NCC, in accordance with Section 38 of the Highways Act 1980 (S38), and all other enabling powers, prior to any Works commencing on site.

NCC has produced S38 Developer Guidance setting out all S38 requirements.

Section 104 Agreement

For any public sewer within a new highway or public open space which a developer seeks to have adopted, the developer must enter into an agreement with Northumbrian Water Limited (NWL), in accordance with Section 104 of the Water Industry Act 1991 (S104), prior to any works commencing on site.

NCC is not party to this agreement but must be notified by the developer that a S104 agreement is in place, and that all sewers have been adopted prior to NCC adopting the highway within which they are contained.

Revisions to Existing Adopted Highways

Section 278 Highway Agreement

For existing adopted highways which a developer affects by the provision of his development, the developer must enter into an agreement with NCC, in accordance with Section 278 of the Highways Act 1980 (S278), and all other enabling powers, prior to any Works commencing on site.

Private developers and contractors must not carry out any works affecting the fabric, use or status of any public highway, whether formally adopted or not, without the express permission of NCC (the highway authority). The public highway may be footpath, footway, verge or carriageway.

NCC have produced S278 Developer Guidance setting out all the detailed requirements.

Public Open Space

There are a number of options open to the developer for future maintenance of public open spaces. The developer may elect to take on the future maintenance himself via a management company, or request NCC to enter into a formal Public Open Spaces Agreement.

Public Open Spaces can be accepted for maintenance by NCC under a separate agreement. Each scheme will be decided on its own merits.

The developer will be required to complete the works in accordance with approved drawings and specifications. They will also be required to maintain the works, including the replacement of dead plants, in accordance with an approved maintenance schedule for a period of 5 years after the issue of a Practical Completion Certificate.

Upon satisfactory completion of the maintenance period NCC will take over maintenance upon payment of an agreed Commuted Sum.

4.2 Definitions

For the purpose of this section the definitions provided for each street type in Section 2 will apply, supplemented by the additional definitions below relating to Industrial Estate Roads.

- Principal Road
- Classified Road
- Local Distributor Road
- Collector Street – Residential Street with Bus Route
- Residential Street
- Shared Surface Street
- Mews, Courtyards and Home Zones
- Industrial Estate: Distributor Road

A road that distributes traffic within industrial areas of 50 hectares or more and forms a link to the existing Highways.

- Industrial Estate: Main Access Road

A road that distributes traffic within smaller industrial areas and forms a link between Estate Roads and either Distributor Roads or existing Highways.

- Industrial Estate: Estate Road

A road that gives direct access to buildings and land within industrial areas.

4.3 General Layout Notes

There shall be no more than a maximum of 30 residential properties served off a single shared surface, with no more than a maximum of 5 properties served of a single shared or private drive.

No private drain or inspection cover must run longitudinally within any adopted area or service verge.

All proposed layouts for adoption will be tested using AutoTRACK (within AutoCAD); therefore an electronic version of the final layout must be submitted to the Section 38 Officer as part of the developer's Engineering Submission.

NCC currently use the "Phoenix 2 Duo (P2-15W with elite 6x4 chassis)" vehicle within AutoTRACK V0.02 "European Vehicles" as the closest equivalent motor vehicle to NCC's fleet of refuse vehicles.

4.4 Road Widths

Typical cross-sections for each street type are illustrated in Section 2; many of the generic street types have several variations to their individual and collective widths. NCC's standard (and preferred) cross-sections should be deemed as:

- **Principal Roads**

Dual Carriageways shall both be 7.30m wide (2 No. 3.65m wide lanes) with an additional 1.50m wide (2.00m for 40mph speed limits and above) mandatory cycle lane in each direction, split by a central reserve of 3.0m, with a 2.0m wide verge and a 2.0m wide footway on each side.

- **Classified Roads**

Single Carriageways shall be 7.30m wide (2 No. 3.65m lanes), with an additional 1.50m wide (2.00m for 40mph speed limits and above) mandatory cycle lane in each direction, with a 2.0m wide verge and a 2.0m wide footway on each side.

- **Local Distributor Roads**

Single Carriageways shall be 6.90m wide (2 No. 3.45 wide lanes), with an additional 1.50m wide mandatory / advisory on-carriageway cycle lane in each direction, with a 2.0m wide verge and a 2.0m wide footway on each side.

- **Residential Street with Bus Lanes**

Single Carriageways shall be 6m wide (6.90m with Bus Route), with a 2m wide verge and a 2m wide footway on each side.

- **Residential Street**

Single Carriageways shall be 5.5m wide (2 x 2.75m wide lanes), with an optional 2m wide verge, and a 2m wide footway on each side.

- **Shared Surface Street**

Single shared area with a nominal 4.8m wide carriageway, with a 2 m wide (minimum)

pedestrian route on each side.

- **Home Zone**

Single shared area with a nominal 4.8m wide carriageway, with a 1.5m wide (minimum) service verge on each side.

- **Industrial Estate – Distributor Roads and Main Access Roads**

Carriageways shall be 7.3m wide (2 x 3.65m wide lanes), with a 3m wide shared footway / cycle lane on each side. Alternatively, if cycling provision is required on-carriageway, then the carriageway shall be 9m wide, incorporating 1.50m wide mandatory/advisory cycle lane in each direction, with a 2m wide footway on each side.

- **Industrial Estate – Estate Roads**

Carriageways shall be 7.3m wide (2 x 3.65m wide lanes), with a 2m wide footway on each side, unless:

- (a) They are less than 30m in length, in which case they may be 6m wide;
- (b) Development is on one side only in which case a 2m wide footway on the development side, and a 2m wide verge on the opposite side of the road shall be provided, constructed immediately adjacent to the carriageway.

4.5 Geometric Alignment

Design standards for the horizontal and vertical alignments of main roads are given in the accompanying tables in relation to their Urban Design Speed, which are provided below for each street type. Further reference should be made to DMRB TD 9/93: Highway Link Design.

It should be noted that design speeds are not always the same as the speed limits imposed upon a route.

Road / Street Type	Design Speed kph (mph)
Principal Road	120 (70) 100 (60)
Classified Road	120 (70) 100 (60) 85 (50)
Local Distributor Road	100 (60) 85 (50) 70 (40)
Collector Street Residential Street with Bus Route	50 (30)
Residential Street	50 (30)
Shared Surface Street	30 (20)
Industrial Estate : Distributor Road	70 (40)
Industrial Estate : Main Access Road	50 (30)
Industrial Estate : Estate Road	50 (30)
Home Zone	20 mph (Naturally calmed to 10mph)

Table 4.1: Design Speeds for Road Types

Horizontal Alignment

The radii shown in Table 4.2 should be adhered to when designing the horizontal alignment for all types of road down to Residential Streets and Industrial Estate Roads.

Design Speed (km/hr)	Normal Radius (metres) For Super-Elevation Of		Minimum Radius (metres) For Super-Elevation Of	
	2.5%	5%	2.5%	5%
120	2040	1020	1020	720
100	1440	720	510	510
85	1020	510	360	360
70	720	360	255	255
60	510	255	127	90
50	360	180	90	90

Table 4.2 Acceptable Horizontal Radii for Design Speeds

Vertical Alignment

The radii shown in Table 4.3 should be adhered to when designing the vertical alignment for all types of road down to Residential Streets and Industrial Estate Roads.

Design Speed (km/hr)	Minimum Radius (metres) [Overtaking Crest]	Minimum Radius (metres) [Stopping Crest]	Minimum Radius (metres) [Stopping and Comfort Sag]
120	N/A	18250	3710
100	40200	10100	2600
85	28650	5530	2010
70	20100	3020	2010
60	14300	1710	1310
50	10050	1005	906

Table 4.3 Acceptable Vertical Radii for Design Speeds

Additional Information – Horizontal and Vertical Alignment

Only in exceptional circumstances, such as tying into existing roads, should the super-elevation exceed 5%.

For the majority of Collector Streets, Distributor Streets and below, super-elevation would not be advisable.

For hog curves the critical radii are for stopping sight distances.

It is not anticipated that all roads would have the facility for overtaking. However, they should have the required road markings to the Traffic Signs Regulations & General Directions to denote this. Further reference may be made to DMRB's TD 9/93: Highway Link Design.

4.6 Gradients

Carriageways

Longitudinal (long-fall)

The minimum allowable gradient (in channel) on bituminous carriageways shall be 0.83% (1 in 120). A formal pre-cast concrete channel block must be provided for any gradient shallower than 1.25% (1 in 80).

The minimum allowable gradient (in channel) on blocked paved carriageways/shared surfaces shall be 1.25% (1 in 80).

The maximum gradient shall be 5% (1 in 20), to comply with the Equality Act 2010 / Disability Discrimination Act (DDA). Any steeper gradient proposed must be discussed with NCC prior to approval.

Transverse (cross-fall)

Standard gradient = 2.5% (1 in 40).

Maximum gradient = 5% (1 in 20)

Minimum gradient = 1.25% (1 in 80)

Footways

Longitudinal (long-fall)

Footways adjacent to carriageway generally reflect their gradients; however this is not essential if an acceptable cross-fall can be provided.

The maximum gradient shall be 5% (1 in 20), to comply with the Equality Act 2010 / Disability Discrimination Act (DDA).

Transverse (cross-fall)

Standard gradient = 3.3% (1 in 30), to 2.5% (1 in 40).

Maximum gradient = 5% (1 in 20)

Minimum gradient = 2% (1 in 50).

Pedestrian Crossings

Maximum gradient = 8% (1 in 12), to comply with the DDA.

4.7 Spacing of Junctions and Accesses

Spacing of junctions on the various types of road shall be provided in accordance with Table 4.4.

Within an Industrial Estate

Private accesses shall not be sited closer than 30m to a road junction measured from centre line to centre line

No gates, checkpoint or other obstruction to an access shall be placed within 20m of the carriageway of an Adopted Highway; this distance may be reduced to 15m if gates open away from the Adopted Highway.

Road Type	Junction Spacing Same Side of Road Centre-to-Centre (metres)	Junction Spacing Opposite Side of Road Centre-to-Centre (metres)
Principal Road	300	300
Classified Road	300	300
Local Distributor	90	40
Collector Street	30	20
Residential Street	30	20
Shared Surface	Not applicable	Not applicable
Distributor Road	90	40
Main Access Road	90	20
Estate Roads / Accesses	30	20

Table 4.4 Junction Spacings

4.8 Radii at Junctions

The junction radii depend upon the junction type. The junction type depends upon the type of major and minor roads, and should be designed in accordance with the Design Manual for Roads & Bridges TD 42/95.

Traffic signal controlled junctions shall be designed in accordance with DMRB TD 50/04.

Table 4.5 sets out for acceptable junction radii. For lower speed roads, where a T-junction is appropriate, the minimum radii shall be 15m.

Where minimum radii are used, the adjacent footway shall be strengthened to avoid damage from possible motor vehicle over-run.

Within an Industrial Estate

The corner radius shall be minimum of 10m unless estate roads serve workshop units only, in which case, they may be reduced to 6m minimum.

For an access to a parking area to be used exclusively by cars, the corner radius shall be a minimum of 6m.

Main Road	Side Road	Standard Radii (metres)	Minimum Radii (metres)
Collector	Collector	10	6
Collector	Residential Shared Surface	6	4.5
Residential	Residential	6	4.5
Residential	Shared Surface	3	1
Shared Surface	Shared Surface	3	1
Existing Highway	Distributor Road Main Access Road	15	15
Distributor Road	Distributor Road Main Access Road	15	15
Distributor Road	Estate Road Access	15	10
Main Access Road	Main Access Road	15	15
Main Access Road	Estate Road Access	15	10

Table 4.5 Standard and Minimum Radii at Junctions

4.9 Radii at Junctions / Visibility Splays

The visibility standards at junctions shall be designed in accordance with the appropriate design speed of the major road.

Table 4.6 sets out visibility criteria are based upon a simple T-junction layout.

If existing site conditions make it impracticable to improve an existing junction to the standards required then the best achievable sight line should be provided, subject to site specific conditions and discussion with NCC.

In new development the visibility splay's full length shall be obtained, although the 9m off-set dimension along the centre line of the side road or access may be reduced to a minimum of 4.5m (Local Distributor and above) and 2.4m (Residential Street and below) The off-set dimension should be no more than 9m to ensure that approach speeds are not excessive (See Figure 4.1).

No boundary walls, fences, landscape planting or other obstructions should be placed or erected within the area of visibility splays.

Within Industrial Estates

The minimum visibility splays shall be 9m x 90m, but for a lightly trafficked road this may be reduced to 4.5m x 90m with the agreement of the Highway Authority. Any reduction below this will only be approved in exceptional circumstances.

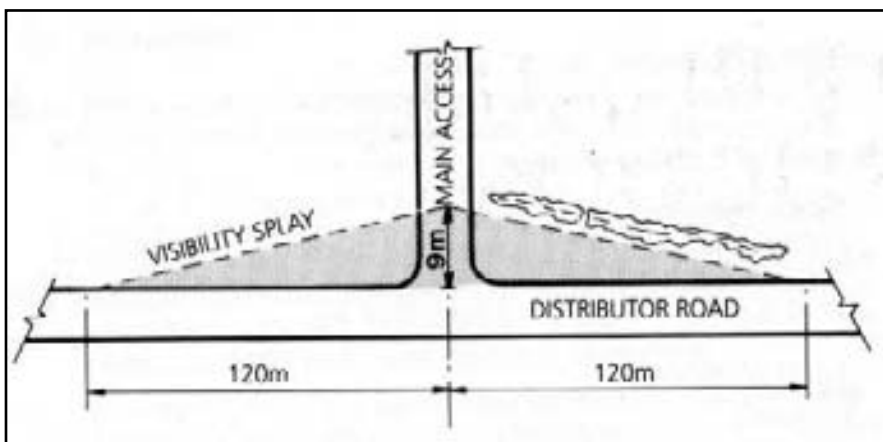


Figure 4.1 Typical T-Junction Visibility Splay

Main Road	Side Road	Off-Set (metres)	Visibility Splay (metres)
Design Speed (120kph ; 70mph)		9.00	290
Design Speed (100kph ; 60mph)		9.00	215
Design Speed (85kph ; 50mph)		9.00	160
Design Speed (70kph ; 40mph)		9.00	120
Residential (70kph ; 40mph)	Residential	9.00	120
Residential (50kph ; 30mph)	Residential Shared Surface	9.00 4.50	90 60
Residential (50kph ; 30mph)	Residential Shared Surface	4.50 2.40	60 45
Shared Surfaces	Shared Surface	2.40	25
Existing Highway (100kph ; 60mph)	Distributor Road	9.00	210
Existing Highway (85kph ; 50mph)	Main Access Road	9.00	160
Distributor Road (70kph ; 40mph)	Distributor Road Main Access Road Estate Road / Access	9.00 9.00 9.00	120 120 90
Main Access Road (50kph ; 30mph)	Main Access Road Estate Road / Access	4.5 4.5	60 45
Estate Road (50kph ; 30mph)	Estate Road / Access	4.5	45

Table 4.6 Visibility Splay Dimensions

4.10 Turning Heads

Cul-de-Sacs over 30m in length are likely to require turning facilities, should have one of the following turning heads provided, with dimensions as shown in Table 4.7.

A minimum of 0.50m clearance strip should be provided around the outer edge of the turning head carriageway for motor vehicle overhang.

Dimension	Large Vehicles	Small Vehicles
A	40m	25m
B	25m	15m
C	20m	10m
R	10m	6m

Table 4.7 Turning Head Dimensions

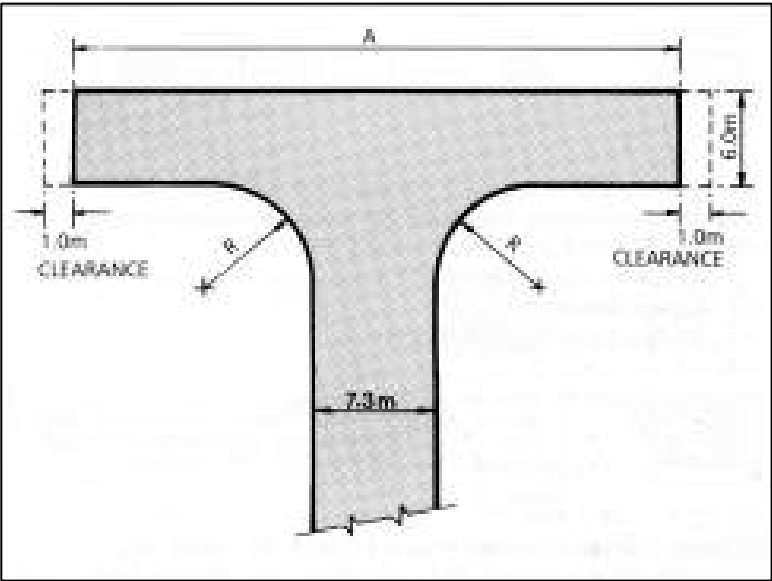


Figure 4.2 Example Hammerhead Turning Head

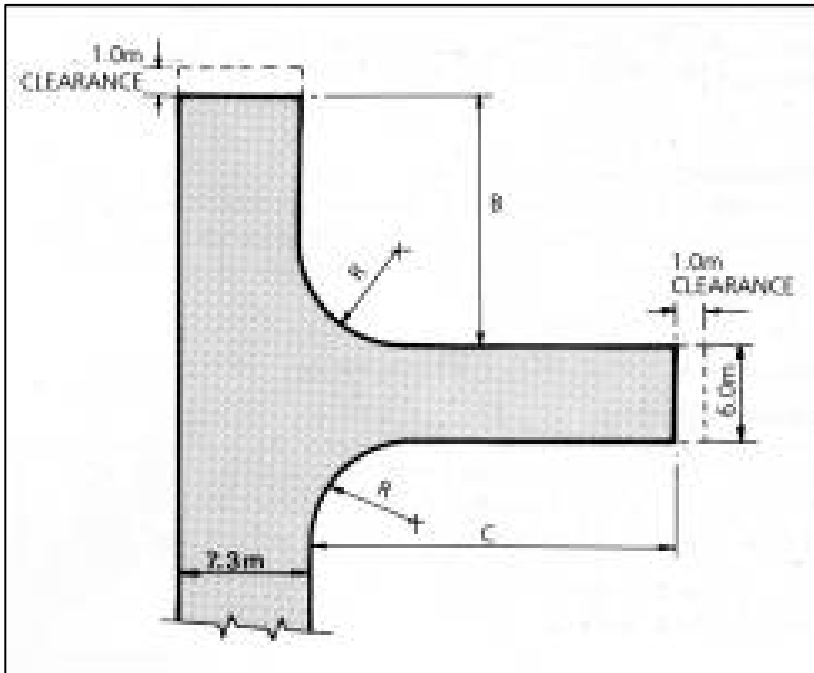


Figure 4.3 Example Alternative Turning Head

4.11 Construction Standards

Carriageway Construction Details

The permitted forms of flexible construction are given in this section.

Typical cross sections are shown in Section 2 for each road and street type.

Pavement Construction Design

Pavement Design (bituminous layers) is in accordance with the Design Manual for Roads and Bridges: Volume 7 Highway Standard “HD 26/06: Pavement Design”. This document quotes clauses from the “Specification for Highway Works”, published by the Department of Transport.

Consideration may be given to the use of recycled Base, provided it can be shown to have equivalent properties.

Compaction

Compaction of the materials shall be in accordance with the specification and discussions with Technical Services.

The sub-base shall be immediately protected with the Base; or, with the approval of NCC the sub-base shall be protected with 50mm Asphalt Concrete at the developer's expense. This 50mm will not be regarded as part of the final construction, and shall be removed and replaced as part of the permanent pavement construction.

Texture Depth

In all cases the texture depth of the surface course shall be 1.5mm

Pavement Foundation Design

The design of the pavement foundation is based on the advice given in Interim Advice Note 73/06 Revision 01: Design Guidance for Road Pavement Foundations. The designs adopted are, in general, "Restricted Designs", however some allowance has been made for the use of "Performance Designs".

The standard carriageway construction details have been assessed on a minimum Stiffness Modulus of 35MPa.

The Stiffness Modulus of the formation will need to be confirmed by the Developer and evidence provided to Technical Services.

If the Developer wishes to submit a revised foundation design based on the "Performance Design" method, then it will be necessary to follow the process laid out in Chapter 5 of Interim Advice Note IAN 73/06 Revision 01: Performance Design.

Sub-formation drainage should be provided to allow the egress of any water which has entered the foundation, or to prevent ground water rising to within 600mm of the Formation Level.

If the sub-grade is found to have a Stiffness Modulus less than 35MPa, then the sub-base thickness should be increased by 100mm for a Stiffness Modulus of 30MPa. If the sub-grade is found to have a Stiffness Modulus less than 30MPa, then the sub-grade must be improved in accordance with Paragraphs 3.22 to 3.25 of IAN 73/06 Rev 01.

Road Construction

Traffic Loading – more than 20 msa (million standard axles)

- Principal Road
- Classified Road
- Distributor Road (Industrial Estate)

Surface Course	40mm	HRA 35/14 F surf 40/60, CL 911
Binder Course	60mm	AC20 HDM bin 40/60 des, CL 929
Base	250mm	AC32 HDM base 40/60 des, CL 929
Foundation	420mm	Type 1 unbound mixture CL 803
	770mm	

Traffic Loading – 5-20 msa (million standard axles)

- Classified Road
- Local Distributor Road
- Collector Street
- Main Access Road (Industrial Estate)

Surface Course	40mm	HRA 35/14 F surf 40/60, CL 911
Binder Course	60mm	AC20 HDM bin 40/60 des, CL 929
Base	180mm	AC32 HDM base 40/60 des, CL 929
Foundation	420mm	Type 1 unbound mixture CL 803
	700mm	

Traffic Loading – 2-5 msa		
<ul style="list-style-type: none"> • Local Distributor Road • Residential Street • Estate Road 		
Surface Course	40mm	HRA 35/14 F surf 40/60, CL 911
Binder Course	60mm	AC20 HDM bin 40/60 des, CL 929
Base	140mm	AC32 HDM base 40/60 des, CL 929
Foundation	420mm	Type 1 unbound mixture CL 803
	660mm	

Traffic Loading – less than 2 msa		
<ul style="list-style-type: none"> • Shared Surface Street – Flexible Construction 		
Surface Course	40mm	HRA 35/14 F surf 40/60, CL 911
Binder Course	60mm	AC20 HDM bin 40/60 des, CL 929
Base	110mm	AC32 HDM base 40/60 des, CL 929
Foundation	370mm	Type 1 unbound mixture CL 803
	580mm	

Traffic Loading – less than 2 msa		
<ul style="list-style-type: none"> • Shared Surface Street – Block Paved Construction 		
Block Paving	80mm	
Bedding	30mm	
Base	110mm	AC32 HDM base 40/60 des, CL 929
Foundation	370mm	Type 1 unbound mixture CL 803
	590mm	

Standard Footway Construction Details

Concrete Flagstones		
Paving Flags	70mm	Pressed pre-cast concrete, CL 1104
Bedding	25mm	Mortar class 2
Sub-Base	150mm	Type 2 unbound mixture CL 804
	245mm	

Flexible Flagstones		
	25mm	AC6 dense surf to 100/150 PD 6691 Clause B.3.5.3
Binder Course	60mm	AC20 Dense Bin to 100/150 PD 6691 Clause B.3.4.8
Sub-Base	150mm	Type 2 unbound mixture CL 804
	235mm	

All free edges of all footways and footpaths to be supported by a pre-cast Concrete Edging (Rectangular Section 50mm x 150mm), laid flush with the footway surface.

Any tactile paving flagstones provided within a flexible footway shall be bounded by a Pre-cast Concrete Edging (Rectangular Section 50mm x 150mm), laid flush with the footway surface. See Appendix A for further information.

Compaction

The sub-base shall be immediately protected by the laying of the base course; or, with the approval of Technical Services, the sub-base shall be protected with a temporary 50mm Asphalt Concrete course at the developer’s expense. The 50mm will not be regarded as part of the final construction, and shall be removed and replaced as part of the permanent pavement construction.

4.12 Surface Water Drainage

General

The surface water drainage and foul sewerage shall be designed as separate systems.

- NWL adopt Public Sewers
- NCC adopt Highway Drains

Public Sewers shall be designed and constructed in accordance with the requirements of Northumbrian Water Limited (NWL). The developer must enter in to an agreement with NWL, in accordance with Section 104 of the Water Industry Act 1991. NCC are not party to this agreement but must be notified by the developer that a S104 agreement is in place, and that all sewers have been adopted prior to NCC adopting the highway.

Highway Drains shall only carry water running off Adopted Highways and must discharge to either a dedicated highway drainage system or a public sewer. It is not permissible to connect house drainage into a highway drain, or connect highway drainage into a house drainage system.

Rain water falling on to highway areas must be collected into a highway road gully or approved surface water proprietary system, and not be allowed to discharge onto private areas, in accordance with the Highways Act 1980, Paragraph 163. Similarly, private areas (forecourts, parking bays etc) must not discharge on to highway areas, but shall be collected within private drainage systems, and subsequently discharge into a private or public sewer, subject to agreement with NWL.

Highway Drains

Highway drains are drains which only carry water running off adopted highways. They shall be designed in accordance with the Transport Research Laboratory (TRL)'s "Road Note No. 35: A Guide for Engineers to the Design of Storm Water Sewer Systems" for a "5 Year Storm" frequency.

The structural design of the pipe lines should be in accordance with the TRL's Building Research Station "Simplified Tables of External Loads on Buried Pipelines" mainly for a classification of 'Main Road Loading'.

All pipes shall have flexible joints.

Cover to Pipes

Drains under carriageways and footways having less than 1200mm cover from finished level, and verges and areas not subject to vehicular traffic where cover is less than 900mm from finished level, shall be surrounded with 150mm of Grade ST2 concrete, Cl. 2602 Table 26/1.

Expansion joints, 12mm wide, containing a suitable pre-formed joint filler, shall be provided within the concrete surround at each pipe joint.

Gullies

Gullies shall be spaced on the basis of a maximum contributing area of 200m² per gully. The run-off from all impermeable highway surfaces shall be included in the design.

Double gullies shall be provided at the low point on a channel in areas which are likely to pond.

Highway Gradients, Crossfall and Camber

The minimum channel gradient shall be 1 in 120 (0.83%) and maximum gradient 1 in 20 (5%).

On straight roads normal cross-fall and camber shall be 1 in 40 (2.5%), but a cross-fall greater than this and up to a maximum of 1 in 20 (5%) may be allowed where necessary to tie into existing levels.

On road curves adverse camber shall be eliminated and the carriageway super-elevated in accordance with Transport in the Urban Environment (DfT).

The standard cross-fall on footways shall be between 1 in 30 (3.3%) to 1 in 40 (2.5%). Any variation to this cross-fall must be agreed with NCC.

Construction

The specification shall be the DfT's "Specification for Roads and Bridges: Series 0500: Drainage and Service Ducts".

Pipelines

Pipes shall comply with Clause 501 and shall generally comply with Clauses 502 to 505. All pipelines under roads and paved areas subject to vehicular loading shall use Type 1 sub-base Clause 803 as trench backfill laid in accordance with Clause 802, except in existing highways where the upper 1500mm below surfacing shall be reinstated in wet-lean concrete to Clause 1030.

All aggregate strengths are assessed in terms of the measured soaked 10% fines value. Aggregate strength for pipe bedding material and filter media shall be a minimum of 110kN.

Magnesium Limestone shall not be used for pipe bedding material or filter media with concrete pipes.

In addition the pipe bedding material shall have a compaction fraction value of 0.2 minimum.

Manholes

These shall be in accordance with Clause 507 modified as follows:

Chambers with a depth not exceeding 5.0m shall be either:

- pre-cast concrete sections to BS 5911-3 and BS EN 1917 of 1050mm minimum diameter surrounded by 150mm Grade ST4 Concrete Cl. 2602 Table 26/1; or
- 225mm minimum thickness of solid Class N engineering brickwork (BS EN 771-1, BS EN 772-3, and BS EN 772-7).

Covers and frames shall be double triangular ductile with a 675 x 675mm clear opening (150mm cover thickness), to BS EN 124: 1994 and BS EN 497:

- Grade D / Class D400 in vehicular trafficked areas, and
- Grade B / Class B125 elsewhere.

In general, benched bases shall be used but where subsoil drainage is necessary, catch-pit bases shall be incorporated, with the base at a level 300mm below the lowest pipe invert.

Gullies

Road gully pots shall be 450mm diameter and 900mm deep (750mm deep in New Residential Developments) with 150mm trapped outlets.

Footway and footpath gully pots shall be 225mm diameter and 550mm deep.

Road, footway and footpath gullies shall be surrounded by 150mm of Grade ST4 Concrete Cl. 2602 Table 26/1.

Only channel-type road gullies will be permitted: Type GA2-450 with captive hinged grate and frame to BS EN 124 (100mm cover thickness), cast iron or ductile.

Side entry gullies will not be permitted.

Footway and footpath gullies: 300mm square mild steel hinged locking grate with flanged frame to BS EN 497.

4.13 Traffic Calming

All roads within new housing developments must include an appropriate Traffic Regulation Order and be traffic calmed or designed to reduce motor vehicle speeds to 20mph maximum.

Roads designated as Home Zones shall be traffic calmed to reduce motor vehicle speeds to 10mph.

NCC consider that traffic calming within new developments should be achieved by using horizontal deflection of the carriageway, or within it, rather than vertical deflection, such as road humps / speed tables.

Traffic calming at the entrances to shared surfaces and home zones from standard Distributor Roads and below, will be best achieved using vertical deflection measures, for example, a ramp lifting the carriageway up by 75mm, possibly in combination with a localised width restriction.

4.14 Traffic Signs and Road Markings

Good practice requires that no more traffic signs are installed than are absolutely necessary from a maintenance and streetscape perspective. Reducing street clutter is essential.

All traffic signs and post-mounted name plates (see Section 4.16) are to be provided as part of the development, and the nearest edge of all signs shall be set back 450mm from the edge of any carriageway.

Sign posts must be installed to ensure an absolute minimum footway width of 1.20m is maintained at all times for accessibility requirements.

Cranked posts should be used to facilitate this minimum footway width.

Within a footway, a minimum clearance of 2.1 metres is required between ground level and the lower edge of a traffic sign. If the footway is a formal shared or segregated cycle route on a footway then this shall be increased to a minimum of 2.4 metres.

Signs and Road Markings shall be provided by the developer in accordance with the “Traffic Signs Regulations and General Directions 2002” and the “Traffic Signs Manual”.

Road markings shall be hot applied thermoplastic and reflectorised in accordance with BS EN 1871 and Series 1200 of the Specification of Highway Works.

Traffic signs shall comply with BS 8442 and Series 1200 of the Specification for Highway Works.

4.15 Street Furniture

All adoptable street furniture, including street lighting columns, must be located entirely within the adoptable highway boundary.

Good practice requires that no more street furniture is installed than is absolutely necessary from a maintenance and streetscape perspective. Reducing street clutter is essential.

NCC requires all street furniture, including pedestrian guardrail, to be supplied with a black finish. A brushed stainless steel finish may be required in feature areas as agreed with NCC.

Standard details are provided for NCC approved street furniture in Appendix A.

4.16 Street Name Plates

Developers are encouraged to erect street name plates at first floor level on properties within residential developments wherever possible. This is to remove the possibility of damage through vandalism, reduce street clutter and hazards, and ensure they are likely to last the life of the development. All of the previous benefits cannot be applied to post mounted plates which can also create informal meeting places and impromptu seats.

We are aware that many residents would not freely give permission to attach a plate to their property and would therefore recommend that the plates be erected prior to the occupation of the property.

The plate should incorporate symbol to Fig 816.1 of the Traffic Signs Regulations & General Directions 2002 if appropriate.

NCC's Standard Detail N26/11 indicates a typical detail for a post mounted plate. The nearest edge of a plate shall be set back a minimum of 450mm from the edge of the carriageway.

4.17 Existing and Proposed Utility Services

General

Developers shall be responsible for ensuring that the requisite notices are served in accordance with the New Roads and Street Works Act 1991, and for agreeing in partnership with NCC, the Statutory Undertakers requirements with respect to:

- Protection and diversion of existing services;
- Provision of new services;
- Provision for future requirements, e.g. ducted crossings.

Phasing of the Works

The developer shall accommodate all such works within the programme, carry out any works on behalf of the respective Statutory Undertakers as they may require, and ensure that all work are completed prior to the surface course being laid.

4.18 Service Strips

In shared surfaces where footways are not provided, a publicly adopted, privately maintained verge not less than 2.00m wide must be provided adjacent to the carriageway on both sides. These verges, or service strips, will be included as adoptable public highway in the Section 38 Agreement.

Statutory Undertaker's apparatus shall be located within the soft landscaped Service Strip on both sides of "carriageway".

Purchasers of properties fronting on to such service strips have license to cultivate them as part of their garden but are prohibited from the building of walls and fences and the planting of trees or shrubs on the strip. The Statutory Undertakers may excavate their services at any time and are not responsible for reinstating the ground to any better standard than cultivated grass.

4.19 Grass Verges

Verges shall be comprised of a 450mm thick lightly compacted layer of top soil, in accordance with Clause 618, fertilized and sown with an NCC approved grass seed.

Verges will normally be protected with a Pre-cast Concrete Kerb with a 100mm high kerb face to positively discourage motor vehicle over-run. All alternative protection proposals must be approved with NCC prior to works commencing on site.

4.20 Street Lighting

NCC has entered into an agreement with Scottish and Southern Electric (SSE) Lighting Services for the design, installation and maintenance of its street lighting assets.

As a consequence of this agreement any new adoptable highway schemes must have the street lighting design approved by SSE, and shall comply with the British Standard Code of Practice BS 5489, SSE's General Specification for "The Supply and Erection of Street Lighting for Subsidiary Roads and Associated Pedestrian Areas", and, the current edition of the "I.E.E. Wiring Regulations for Design and Verification of Electrical Installations".

The specification provides requirements for the columns, lantern, brackets and fixings, cabling, supply connections, servicing regimes and lighting levels for various locations. A copy of the General Specification for Street Lighting may be obtained from SSE.

Columns, brackets and lanterns shall be erected and lit to coincide with the occupation of the development or the use of the public highway. This is a requirement in the S38 Agreement, and works need to be programmed accordingly.

Particular care should be taken when designing lighting for areas that are inaccessible to Lighting Maintenance Vehicles. "Raise and lower" columns must be used to allow manual maintenance of installations.

SSE Lighting Services offer developers a complete design and installation service (see Contact Information at front of document).

Further information can be found in NCCs S38 Developer Guidance.